Smoking among Norwegian schoolchildren 1975–1980

I. Extent of smoking in the age group 12–15 years, 1975

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Aarø, L. E., Hauknes, A. & Berglund, E.-L.: Smoking among Norwegian schoolchildren 1975–1980: I. Extent of smoking in the age group 12–15 years, 1975. *Scandinavian Journal of Psychology*, 1982, *22*, 161–169.

213 600 pupils from grades 6–9 (age 12–15) in the primary school in Norway filled in a questionnaire about smoking habits (1975). The headmaster of each individual of the 2 824 schools participating in the study filled in reports giving the local frequencies of daily smokers, occasional smokers and nonsmokers for each grade and for boys and girls separately. The school-reports also contained questions about demographical properties of the school. A sample of 6 968 questionnaires from the pupils (those who were born on the sixth irrespective of month) were also submitted for statistical analysis. Compared with previous studies, the percentage of smokers among girls proved to have increased considerably. The tendency found in many western industrialized countries, that smoking is increasing among girls more than among boys, or that boys are reducing smoking to a greater extent than are girls, was confirmed also for Norway. In all 19 counties there was a higher percentage of daily smokers among girls than among boys. Higher percentages of occasional smokers or pupils who had tried smoking were found in small schools and scattered settlements. Norway may be divided into geographical areas according to the differences in the smoking habits of girls and boys. In the counties in the south and to the west, girls have not surpassed boys to the same extent as in the rest of the country. From previous political-cultural research it is known that the south and west is characterized by temperance and prohibition movements, higher frequencies of religious attendance, as well as a distintiveness in voting behaviour.

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In 1975 the National Council on Smoking and Health began a research project on smoking among Norwegian schoolchildren. The project included a series of data collections and separate studies, all with the aim of clarifying and making more effective the measures intended to limit the extent of tobacco smoking at young age, and to delay or prevent start of smoking. The project forms the basis of the present strategy of the National Council on Smoking and Health in its information campaigns among young people.

The project on smoking among schoolchildren in Norway is not concluded, but will continue for a number of years in the form of new studies and data collections. In this way a continual feedback on the measures implemented will be obtained. The present article focuses on the prevalence of smoking, whereas article II will comment upon the influence of the social environment on smoking habits, and article III on the effect of anti-smoking campaigns (Aarø, 1981 *a*; 1981 *b*).

As early as in 1957 the Norwegian Cancer Society conducted a study comprising more than 9 000 schoolchildren (Nilsen, 1959). For purposes of comparison it may be mentioned that the international pioneer study—Daniel Horn's Oregon Project—was conducted in 1958 (Horn et al., 1959).

The first study on smoking habits among a sample of schoolchildren in Norway (1957) was followed up by new studies in 1963 and in 1967

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(Nilsen, 1967). The last was limited to schoolchildren in Oslo. Children and youth in the age groups 13–18 years were included in the first study, 11–19 years in the second, and 10–19 years in the third.

The 1957 study showed a distinct difference in the smoking habits of boys and girls. There was both a higher percentage of daily smokers and a higher total percentage of smokers among the boys than among the girls. This difference was not as apparent in the later studies. However, in 1967 there still was a higher prevalence of smoking among boys than among girls.

Otherwise, the study from 1967 disclosed that smoking occurred among pupils down to the age of 10 years. One per cent of boys and girls were daily smokers, while 1/5 of the boys and 1/10 of the girls smoked occasionally at this age. When it comes to changes in smoking habits in the period 1957–1967 (Oslo), a distinct increase in the percentage of daily smokers in the age groups 13–15 years was observed.

In a series of annual studies of drug habits among adolescents in Oslo (Irgens-Jensen & Rud, 1977) for the entire period 1972–1976 a higher percentage of daily smokers was found among girls than among boys aged 12–21 years. These annual studies among adolescents in Oslo also showed an increase in smoking up to 1974 when 42% of the boys and 46% of the girls in the relevant age groups stated that they smoked daily. In 1976 the percentage of daily smokers among adolescents in the same age group had dropped to 35% for boys and 39% for girls. The same trend was observed among boys in Bergen, while girls in Bergen only showed a small reduction in smoking during the last five years. (Irgens-Jensen, 1980).

Swedish studies from 1971, 1976 and 1977 among youth aged 16 years showed a decrease in smoking among boys from 41% in 1971, through 27% in 1976 to 25% in 1977. For girls the figures were 47% in 1971 and 40% in 1976 and in 1977. Smoking seems to be on the decline among both boys and girls in this age group, but the reduction is greatest for the boys. In all three studies there was a higher percentage of smokers among the girls (Lukács, 1978). In a comparative study of the years 1971–1974 (Hibell & Jonsson, 1977) the conclusion is more or less the same. In the period covered by the study there was a distinct reduction in the percentage of smokers among boys, while the proportion of girls who smoked remained the same for the whole period.

Experimenting with smoking often begins at an early age. A Danish study (Vilstrup, 1973) showed that half of the girls and two-thirds of the boys had tried to smoke before they were 10 years old. Almost none of this age group smoked daily. The same study concluded further that the greatest increase in the percentage of smokers among both boys and girls occurs in the age groups 12–15 years. Already at the age of 14 there were found to be more than 40% daily smokers among Danish schoolchildren. While previous studies in Denmark have shown that smoking was more prevalent among boys, the trend in the 1970s was towards smaller differences in smoking habits between boys and girls.

A Finnish study from 1973 (Rimpelä et al., 1977) reports on smoking among adolescents in the age groups 14, 16 and 18 years. Among the boys the percentage of daily smokers increased from 17% at 14 years, through 39% at 16 years to 44% at age 18. The corresponding values for the girls were 21%, 33% and 41%, respectively. At the beginning of the 1960s there was far less smoking than there is today among young people in Finland, and furthermore, the girls smoked far less than the boys. The increase in the percentage of daily smokers has also been considerably greater among the girls than among the boys. According to Rimpelä's study from 1973, smoking is even more prevalent among girls than among boys at the age of 14.

In 1974 a study was conducted on smoking among children and adolescents in the age groups 9–17 years in Reykjavik, Iceland (Sigurdsson, 1975). In the group aged 9 years, 5% of the boys and 3% of the girls stated that they smoked. A rapid increase in smoking was registered in the age groups 12–13 years, and in the age groups 13–17 years there was more smoking among the girls than among the boys. Among those aged 17, 47% of the boys and 62% of the girls smoked daily. If one compares the Icelandic study from 1974 with a study from 1959, one finds that smoking among girls has increased two to threefold.

British studies on smoking among schoolchildren are summarized in a report from the Social Science Research Council and the Medical Research Council (Bewley et al., 1976). In two studies the average age when the children started to smoke was 10–11 years. All the larger British studies have shown more smoking among boys than among girls. In a study among schoolboys in England and Wales,

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Bynner (1969) found an increase in the percentage of those who smoked at least one cigarette daily from 4% in the age group 11–12 years to 38% among those aged 15. All the other British studies showed a similar increase for the same age groups, but with lower percentages for girls. Recent studies indicate, however, that smoking is now becoming more prevalent among girls than among boys (Rorke, 1977; Pearson & Richardson, 1978).

Some of the British studies concluded that smoking is more prevalent in towns, in densely populated areas and in districts in the centre of towns than in rural areas, and on the outskirts of the towns.

American studies in the period 1968–1974 (DHEW publication, 1976) conclude that there has been little change in the percentage of boys who smoke at least once a week. Among the girls, however, there has been a gradual increase in the percentage of smokers in all age groups. This has practically eliminated the difference in smoking between boys and girls. In 1968 the percentage of girls who smoked was only half of that of the boys. In 1974 there was no longer any difference of the smoking habits between the sexes. A study from California (San Mateo County Dep., 1976) confirms the unfavourable trend among girls as regards smoking. Since 1970, when the girls passed the boys, the percentage of smokers among girls has increased, while the proportion of boys who smoke has been continuously falling.

In 1974 a study was conducted on drug usage among schoolchildren and students in Toronto (Smart & Fejer, 1975). The results were compared with similar studies from 1968, 1970 and 1972. While drug usage in general showed little change from 1972 to 1974, smoking habits did. The percentage of smokers in the sample, which comprised pupils in the 7th, 9th, 11th, and 13th grades, declined from 38% to 34%. The ratio between the percentage of smokers among girls and the percentage of smokers among boys increased through the four studies. In 1974, one could for the first time report a higher percentage of smokers among girls. (See also Rorke, 1977.)

Tölle (1974) reports on West-German studies on smoking among children and adolescents. In the age group 10–18 years in a larger town in Germany, the percentage of smokers was 41% among the boys and 33% among the girls. Only about a quarter of the young people smoked regularly. Comparable results were also found for other geographical regions. Boys in the age group 17–18 years smoked less than their fathers. Girls in the same age group, however, smoked to a greater extent than their mothers. This may indicate that the similar tendency apparent in North America, Great Britain and the Scandinavian countries also applies to Germany. In all these countries the ratio of per cent smokers among girls over per cent smokers among boys has increased.

METHOD

The intention of the project was to make a survey of smoking habits in those grades of the primary school where smoking begins to be customary. A pilot study showed that there was little smoking before the age of 10–11 years. At the age of 11 years about half of the pupils had tried to smoke, at 12 years of age more than 80% of both sexes had tried to smoke. To avoid stimulating interest in smoking at too low age levels, it was decided to exclude the age-groups 10–11 years. The project thus comprised the age groups 12–15 years.

According to figures from the Central Bureau of Statistics, the population comprised about 243000 pupils of which 51% were boys. A somewhat unusual procedure was chosen for the collection of data. All schools in Norway with pupils in the relevant age groups were asked to participate in local studies and sum up the results in own reports. The information asked for in the school-reports (to be filled in by the headmaster of each school individually) was number of daily smokers, number of occasional smokers, and number of non-smokers for boys and girls for each grade. There were also questions about anti-smoking measures, size of the school, its location, organizational pattern etc. In addition, the schools were asked to return completed questionnaires (anonymous) from all the pupils born on the 6th of each month. With 100% participation by the schools and no absence among the pupils, this would give a sample of about 8000. A registration of the whole population is of course unnecessary if the only purpose is a mapping of smoking habits. However, by giving all schools in Norway with pupils in the relevant grades the opportunity to participate through local studies, the intention was to stimulate the teachers', parents' and pupils' interest in the prevention of smoking at younger ages.

Questionnaire and instruction

In the pilot study, 500 pupils from an urban and a rural district were interviewed twice. Different questionnaires, interviews and instructions were used on the two occasions. The pupils' replies concerning own smoking habits seemed to be moderately influenced by the interview procedure. After a further adjustment of instructions and questionnaire, it was agreed that a sufficiently precise instrument had been developed for the registration of smoking habits among schoolchildren.

The material sent to the schools consisted of:
— briefing to the headmaster/headmistress

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Table 1. *Smoking habits by age and sex*

Age	Per cent daily smokers	Per cent occasional smokers	Per cent nonsmokers who have tried to smoke	Per cent never smoked	Total %	Total N
Boys						
12	2.3	25.6	44.3	27.8	100.0	880
13	6.6	28.7	44.7	20.0	100.0	883
14	16.4	29.2	39.8	14.6	100.0	927
15	22.5	24.0	40.0	13.5	100.0	839
Girls						
12	1.5	22.0	36.6	39.9	100.0	908
13	7.0	28.9	38.6	25.4	99.9	857
14	16.5	34.2	32.3	17.1	100.1	855
15	28.3	30.3	29.2	12.3	100.1	789

— instruction to the teachers who were to be responsible for collecting the data
— questionnaires for the pupils, and
— a report form where, among other things, the local results from the schools as well as demographical information were to be filled in by the headmaster/headmistress.

The pupils' questionnaire contained questions about their smoking habits and about the smoking habits of their parents, older brothers, sisters, and friends. The pupils were also asked whether their parents had given them permission to smoke, whether they knew the age-limit for purchase of tobacco in Norway (16 years), and about future smoking plans.

Response rate

The study was conducted in 2824 schools in November 1975. Schools comprising 229500 or 94% of the population participated. Due to absence from school the final data yielded information from 213600 or 88% of the population. Among the schools not participating was a predominance of small schools which stated that they would have difficulty in maintaining anonymity during collection of data.

RESULTS

Smoking habits in different age-groups

There is an acceptable correspondance between the results from the school reports and the results based on the 6968 replies from pupils born on the sixth of each month. For certain age-groups, for boys and girls alike, the data from the sample shows more smoking than what appears in the school reports. For other age groups, the lowest percentage of smokers is found in the sample. Disagreement is greatest for 15-year-old girls, where the percentage of daily smokers is 31.6% according to the school reports, and 28.1% according to the sample data.

Since more detailed information about smoking habits has been collected from pupils in the sample, the results on smoking habits in the different age groups is based on replies from the sample (Table 1 and Fig. 1).

For the age groups included in the study the prevalence of smoking increased markedly with age for both boys and girls. In the age group 12 years, the percentage of daily smokers is about 2% for both sexes, increasing to 7% for the group aged 13, and 16–17% for those aged 14. In the oldest group aged 15 there is a difference in the smoking habits of girls and boys; as many as 28% of the girls smoke daily as against 23% for the boys. ($\chi^2=6.78$, $df=1$, $p<0.01$).

The percentage for the 12-year-olds who stated

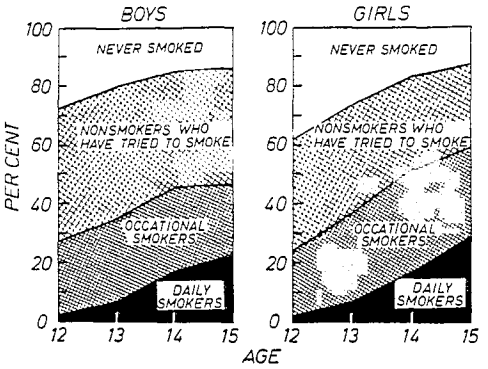

Fig. 1. Smoking habits by age and sex.

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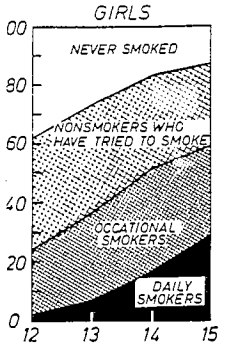

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Table 2. *Mean cigarette consumption per day among daily smokers by age and sex*

Age	Cigarettes per day (mean)	N
Boys		
12	4.6	17
13	4.8	56
14	5.4	149
15	7.1	188
Girls		
12	3.4	12
13	4.4	57
14	5.3	136
15	6.5	222

that they smoked daily or occasionally is 28% for the boys and 24% for the girls (χ^2=4.50, df=1, p<0.05). Among the group aged 15 there is a higher percentage of girls who smoke either daily or occasionally: 59% as against 47% for the boys. (χ^2=23.27, df=1, p<0.001). The percentage who have tried smoking is 72% for boys and 60% for the girls in the lowest age group (χ^2=28.29, df=1, p<0.001). Among those aged 15 on the other hand, there is no noticeable difference between girls and boys in percentage who have tried smoking. The figures are 88% and 87% for girls and boys respectively (χ^2=0.40, df=1, p>0.05).

On the basis of the figures given above the development of daily smoking among girls and boys is parallel for the age groups 12–14 years. Among those aged 15, however, there is a significantly higher proportion of daily smokers among the girls. If occasional smokers, or in addition those who have tried to smoke are included, it is further shown that while more boys smoked at an age of 12 years, more girls did so at an age of 15 years. The general conclusion therefore is that there seems to be a greater increase in smoking among girls in the present age groups and that at the end of compulsory schooling, smoking is more widespread among girls irrespective of how smoking is defined. Among daily smokers cigarette consumption increases with age (Table 2). 12 year old boys smoke daily averagely 4.6 cigarettes and girls 3.4 cigarettes. At 15 years this increases to an average daily consumption of 7.1 cigarettes among boys and 6.5 cigarettes among girls, the increase being significant for both sexes (Boys: F=8,66, df=3,406, p<0.001; Girls: F=6,25, df=3,423, p<0.001).

Developments from 1957–1975

Table 3 and Fig. 2 show changes in smoking habits of Norwegian schoolchildren for the period 1957–1975. It is seen that daily smoking has increased among boys and girls in all age groups. The increase seems to be particularly obvious among the girls for the period 1963–1975. If occasional smokers are added to the daily smokers through all three studies, a decline in smoking among boys may be observed, while for girls there is a marked increase in smoking in the oldest age group (13–15 years).

There was no nation-wide study of smoking among schoolchildren in Norway between 1963 and 1975. Accordingly it is not known whether the increase in daily smoking among children of both sexes has occurred evenly throughout the intervening period or whether the trend may have reached a peak and culminated sometime between the two dates. A series of studies from Oslo indicate that even daily smoking may be on the decline in certain urban areas after having reached a peak at the middle of the seventies (Irgens-Jensen & Rud, 1977). While 46% of the girls and 42% of the boys smoked daily according to a study from 1974, the figures were down to 35% and 30%, respectively, in 1980. A reduction in the percentage of daily smokers has also been confirmed for a representative sample of boys in Bergen, while girls in the same town only showed minor variations (Irgens-Jensen, 1980). Data collected from a rural area of Central Norway (Valdres) showed no decline in daily smoking among 12–15-year-old pupils between 1975 and 1978. (n=781). On the contrary, the figures rather

Table 3. *Smoking habits in 1957, 1963 and 1975 by age and sex*

	Boys			Girls		
Age	1957	1963	1975	1957	1963	1975
Per cent daily smokers						
12	(a)	1	2	(a)	0	2
13	3	3	7	0	1	7
14	6	8	16	0	3	16
15	12	19	23	3	7	28
Per centadaily + occational smokers						
12	*a*	47	28	*a*	28	24
13	57	47	35	25	33	36
14	57	50	46	36	38	51
15	60	58	46	40	43	59

[a] The 1957-study did not include pupils 12 years old.

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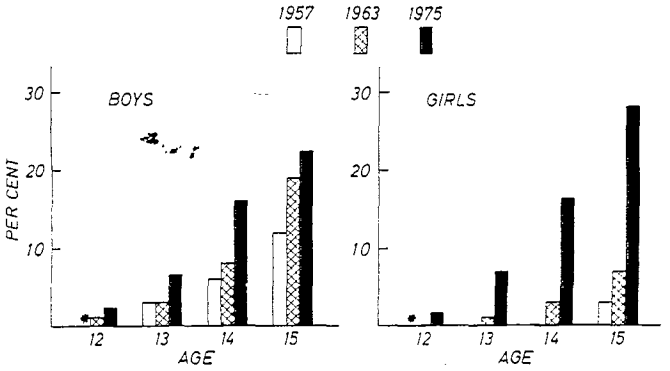

Fig. 2. Per cent daily smokers 1957, 1963 and 1975 by age and sex. (*No data on 12-year-old pupils for 1957.)

indicate a slight increase in the percentage of daily smokers among girls.

To sum up; the increase in daily smoking up to 1975 was greater for girls than for boys. The total percentage of smokers (daily + occasional) showed a decline among boys, while the girls increased their smoking irrespective of how smoking is defined. Studies from Oslo and Bergen have shown a reduction in the percentage of smokers among boys in both towns. Among girls, however, the reduction is significant only in Oslo. No reduction in daily smoking is found among boys and girls in rural districts.

Demographic variables

The geographical variation of the prevalence of smoking in Norway, boys and girls taken separately, is somewhat complicated showing no clear regional pattern. However, the most northern county (Finnmark) has the highest prevalence of smoking; as much as 31% of the boys and 46% of the girls were daily smokers at an age of 15. If occasional smokers are included, the figures are 75% and 74% respectively.

The geographical pattern becomes clearer if one analyzes the difference between boys and girls based on the percentage of daily smokers. In this respect the greatest difference between girls and boys was found in the counties farthest to the east and the north. There is less difference in the counties to the south and west. The trend that girls have caught up with and surpassed the boys as regards smoking at the age of 15 seems to be less pronounced in the western and southernmost parts of the country. The same geographical variation is also known from political-cultural studies. Most of those counties where the girls' lead over the boys in smoking is smallest, are characterized by temperance and prohibition movements, religious attendence, as well as a distinctiveness in voting behaviour, and they have "constituted a bulwork for defence of Lutheran orthodoxy and pietistic fundamentation against the radicalizing and secularizing influence of the cities". (Rokkan, 1967). It is therefore hardly surprisning that sex differences as regards smoking habits seem to be part of the cultural distinctiveness of the south and west. Thus social norms must be taken into account when smoking habits of the young are concerned.

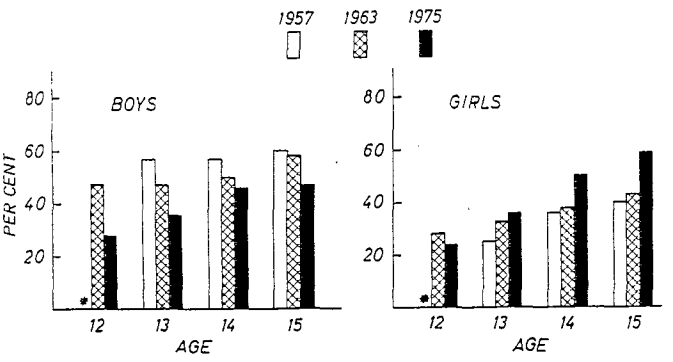

Fig. 3. Per cent daily + occasional smokers 1957, 1963 and 1975 by age and sex (*No data on 12-year-old pupils for 1975.)

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Other demographic variables analyzed in relation to smoking habits separately for boys and girls were number of pupils at the local school, type of settlement in the surrounding of the school (densely, scattered, or both), increase in population in the district in the last five years, increase in number of pupils at the local school in the last five years, and age of the school (more than five years old or not).

In small schools and scattered settlements, the percentage of pupils who had tried smoking was significantly higher than for larger schools and densely populated settlements. At the age of twelve, in schools with less than 300 pupils, 77% of the boys and 63% of the girls had tried smoking. In schools with more than 500 pupils, the figures were 61% and 46%, respectively (Boys: $\chi^2=12.53$, $df=?$, $p<0.01$: Girls: $\chi^2=13.80$, $df=2$, $p<0.01$). Among girls in sparsely built-up areas, 68%, 80% and 90% had tried smoking at the ages 12, 13 and 14 years. The figures for densely settled areas are 56%, 72% and 80%, respectively (12 years: $\chi^2=9.32$ $df=1$, $p<0.01$: 13 years: $\chi^2=4.64$, $df=1$, $p<0.05$; 14 years: $\chi^2=8.48$, $df=1$, $p<0.001$). This may indicate that it is more difficult to escape from social norms favouring smoking in smaller social milieus than in larger schools and more densely populated areas. This tendency, however, is valid only for occasional smoking or smoking tried, not for daily smoking. A high percentage experimenting with smoking, combined with a low percentage of daily smokers may be due to some conflict between the peers' pressure in favour of and the parents' pressure against smoking. (See Aarø, 1981 *b*.)

DISCUSSION

The 1975-study of smoking among children and adolescents in Norway received overwhelming support. Schools with pupils in the relevant grades were given the opportunity to join the project voluntarily, and almost all of them did. This shows a high interest in this branch of health education among teachers. A study (Seip, 1978) on the smoking habits of primary school teachers in Norway has shown the percentages of daily smokers in this group to be low, 25% among men and 15% among women. This may be one explanation of the high response rate.

The prevalence of smoking in a population follows a somewhat complex pattern. Certain groups of the population are the first to start smoking, and the same groups may well be the first to curtail it. At the beginning of the 1950s and beginning of the 1960s, smoking was far more widespread among boys than among girls.

In 1975, in all counties of Norway, there is a higher prevalence of smoking among 15-year-old girls than boys of the same age. This implies a changed situation with regard to smoking education and it becomes especially important to develop information strategies particularly addressed to girls.

In addition to the results quoted so far, a series of surveys on smoking habits in the adult population (Norwegian Cancer Society 1956–1980; Central Bureau of Statistics 1973–1980) may be mentioned. It is known that the prevalence of smoking among women has increased over a number of years right up to the start of the 1970s, while smoking has simultaneously declined among men. Presently men are ahead of women in the process of development represented by changes of smoking habits in the population. It seems that the same applies for young people. While smoking among boys was the greatest problem 20 years ago, it is smoking among girls which in 1975 presents the greatest challenge. This development is not unique for Norway, but rather a general trend which can be observed in a number of western industrialized countries.

A question of practical interest is at what age smoking can be opposed most effectively. The present results suggest 13 years as the critical age. There is hardly any smoking among pupils in younger age groups. In these groups intensive information campaigns may lead to increased experimenting with smoking. Intensive stop-smoking campaigns before the age of 13 may easily give the impression that a large number of children do smoke at this age, and may thus legitimize smoking for those who have never tried it as well. Among younger children, anti-smoking campaigns should be aimed rather at influencing attitudes than behaviour. Careful planning is probably necessary to avoid boomerang effects among the younger children.

It is known from previous studies in Norway that certain vocational groups and certain social sectors of the population are the first to curtail smoking. In the period 1952–1974, medical doctors of both sexes reduced smoking by half (Aarø, 1977). As mentioned above, teachers represent another group which today have a particular low prevalence of smoking. In the Oslo study and others, the conclu-

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sion is that smoking is decidedly less prevalent among persons with a higher level of education and income (Bjartveit & Løchsen, 1979; Holme et al., 1976). The same pattern probably applies to the younger generation. Figures from the present study indicate that young people from urban areas may be ahead of their contemporaries from rural areas as regards reducing or giving up smoking. Future efforts against smoking should not only be directed against the important group comprised of 13-year-olds in general, or girls in particular. It should be equally important to single out the particular groups of young people where smoking is especially widespread. A more detailed study of the cultural and social processes behind the prevalence of smoking is thus called for (see Aarø, 1981 *b*).

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Application to Regulate Tobacco Products Under the Hazardous Products Act by Physicians for a Smoke-Free Canada

COMMENTARY

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May 12, 1986

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Part II, Sections A, B and C present a generally fair and accurate account of the contents of tobacco smoke, the health hazards of tobacco and tobacco addiction. The authors indicate the U.S. Surgeon-General reports smoking to be a contributory factor in cancers of the bladder, kidney and pancreas. However, a recent authoritative review from the International Agency for Research on Cancer (IARC monographs on the evaluation of carcinogenic risk of chemicals to humans: tobacco smoking, Volume 38, IARC, WHO, Lyon, France, in press) concludes that cancers at these sites should now be considered as causally related to cigarette smoking. Other cancers previously identified as causally related to cigarette smoking are cancers of the oral cavity, larynx, oesophagus and lung.

In Part III - 5, the applicants present a number of clear and well-reasoned arguements as to why tobacco advertising needs to be regulated. Recommendations to regulate tobacco advertising have been made repeatedly by professional, governmental and international health agencies, many of which are cited.

In Part III - 5(e) data on smoking among youth are cited. A February, 1986 survey indicates that there was virtually no change in daily smoking among youth aged 12-29 since February, 1985. In February 1986, 24% of 12-19 year olds reported smoking daily as did 45% of those aged 20-29.

In Part III - 5(f) data on smoking among Norwegian youth before and after the institution of a legislated smoking ban in 1975 are cited. However, the changes cited are based on small samples of a rather narrow age range (13-15) of adolescents. In 1984, 27% of Norwegian boys and 22% of Norwegian girls aged

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16-20 reported smoking daily. In the same year 24% of Canadian boys and 25% of Canadian girls aged 12-19 reported daily smoking. Annual per capita consumption of tobacco did not change markedly from the 1950's in Norway until 1980 whom the price was increased substantially through taxation. Relative to other industrialized countries, Norway has a very low rate of tobacco consumption. It also has the longest experience with an effective prohibition of tobacco advertising. However, neither data on changes in smoking prevalence among youth nor changes in overall tobacco consumption in that country offers compelling evidence that banning tobacco advertising reduces either smoking by youths or overall tobacco consumption. The evidence is suggestive, but not conclusive.

Also in Part III - 5(f), evidence is presented that children are most likely to smoke the most heavily promoted brands. Several studies in different countries have all reached this conclusion. However, the most heavily reported brands are also the most widely used, suggesting that it is also possible that children are influenced by what they see other people smoking, perhaps more so than advertising expenditure by brand.

In Part III - 5(g) it is indicated that the tobacco industry spent an estimated $96 million on advertising in 1982. The Canadian tobacco Manufacturers' Council, representing 99.5% of domestic cigarette sales, reported spending $75 million on tobacco advertising in 1985.

In Part III - 5(i) it is asserted that Maclean's has never carried a "major article on the health hazards of smoking." What constitutes a "major article" is open to interpretation. In fact Maclean's has carried many

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articles concerning smoking. Recently, they published a two-page advocacy advertisement from the Non-Smokers' Right Association headed "30,000 Die While Feds Sit on Hands."

Maclean's and other national magazines have a practice of asking tobacco manufacturers if they would like to withdraw advertisements from an upcoming issue that will have editorial content concerning smoking and health. The tobacco companies usually do avoid advertising in such issues, but place their ads in subsequent issues. A full-page advertisement in a large circulation national Canadian magazine costs $5,000 - $10,000.

In Appendix A, the authors suggest a phased ban on advertising over two or three years.

Exempted under sections 21(1)(b) and 23.

The applicants propose a phased ban to give newspapers and magazines (presumed to be most dependent on tobacco advertising) time to diversify their advertising base. In fact, only a small part of newspaper advertising revenue comes from tobacco (less than 5%) while a substantial proportion of billboard advertising revenue (22%) comes from tobacco.

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provide the person who requested the record with a written explanation of the methods used in conducting the tests.

Preliminary testing

(4) For the purposes of this section, the results of product or environmental testing do not include the results of preliminary testing conducted for the purpose of developing methods of testing.

Disclosure if a supplier consents

(5) The head of a government institution may disclose any record that contains information described in subsection (1) with the consent of the third party to whom the information relates.

Disclosure authorized if in public interest

(6) The head of a government institution may disclose any record requested under this Act, or any part thereof, that contains information described in paragraph (1)(*b*), (*c*) or (*d*) if such disclosure would be in the public interest as it relates to public health, public safety or protection of the environment and, if such public interest in disclosure clearly outweighs in importance any financial loss or gain to, prejudice to the competitive position of or interference with contractual or other negotiations of a third party.

Operations of Government

Advice, etc.

21. (1) The head of a government institution may refuse to disclose any record requested under this Act that contains

(*a*) advice or recommendations developed by or for a government institution or a Minister of the Crown,

(*b*) an account of consultations or deliberations involving officials or employees of a government institution, a Minister of the Crown or the staff of a Minister of the Crown,

(*c*) positions or plans developed for the purpose of negotiations carried on or to be carried on by or on behalf of the Government of Canada and considerations relating thereto, or

(*d*) plans relating to the management of personnel or the administration of a government institution that have not yet been put into operation,

if the record came into existence less than twenty years prior to the request.

des méthodes utilisées pour effectuer les essais.

Essais préliminaires

(4) Pour l'application du présent article, les résultats d'essais de produits ou d'essais d'environnement ne comprennent pas les résultats d'essais préliminaires qui ont pour objet la mise au point de méthodes d'essais.

Communication autorisée

(5) Le responsable d'une institution peut communiquer tout document contenant les renseignements visés au paragraphe (1) si le tiers que les renseignements concernent y consent.

Communication dans l'intérêt public

(6) Le responsable d'une institution fédérale peut communiquer, en tout ou en partie, tout document contenant les renseignements visés aux alinéas (1)*b*), *c*) et *d*) pour des raisons d'intérêt public concernant la santé et la sécurité publiques ainsi que la protection de l'environnement; les raisons d'intérêt public doivent de plus justifier nettement les conséquences éventuelles de la communication pour un tiers : pertes ou profits financiers, atteintes à sa compétitivité ou entraves aux négociations qu'il mène en vue de contrats ou à d'autres fins.

Activités du gouvernement

Avis, etc

21. (1) Le responsable d'une institution fédérale peut refuser la communication de documents datés de moins de vingt ans lors de la demande et contenant:

a) des avis ou recommandations élaborés par ou pour une institution fédérale ou un ministre de la Couronne;

b) des comptes rendus de consultations ou délibérations où sont concernés des cadres ou employés d'une institution fédérale, un ministre de la Couronne ou le personnel de celui-ci;

c) des projets préparés ou des renseignements portant sur des positions envisagées dans le cadre de négociations menées ou à mener par le gouvernement du Canada ou en son nom, ainsi que des renseignements portant sur les considérations qui y sont liées;

d) des projets relatifs à la gestion du personnel où à l'administration d'une institution fédérale et qui n'ont pas encore été mis en œuvre.

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Exercise of a discretionary power or adjudicative function

(2) Subsection (1) does not apply in respect of a record that contains

(a) an account of, or a statement of reasons for, a decision that is made in the exercise of a discretionary power or an adjudicative function and that affects the rights of a person; or

(b) a report prepared by a consultant or adviser who was not, at the time the report was prepared, an officer or employee of a government institution or a member of the staff of a Minister of the Crown.

(2) Le paragraphe (1) ne s'applique pas aux documents contenant:

a) le compte rendu ou l'exposé des motifs d'une décision qui est prise dans l'exercice d'un pouvoir discrétionnaire ou rendue dans l'exercice d'une fonction judiciaire ou quasi-judiciaire et qui touche les droits d'une personne;

b) le rapport établi par un consultant ou conseiller à une époque où il n'appartenait pas au personnel d'une institution fédérale ou d'un ministre de la Couronne.

Testing procedures, tests and audits

22. The head of a government institution may refuse to disclose any record requested under this Act that contains information relating to testing or auditing procedures or techniques or details of specific tests to be given or audits to be conducted if such disclosure would prejudice the use or results of particular tests or audits.

Examens et vérifications

22. Le responsable d'une institution fédérale peut refuser la communication de documents contenant des renseignements relatifs à certaines opérations — essais, épreuves, examens, vérifications —, ou aux méthodes et techniques employées pour les effectuer, et dont la divulgation nuirait à l'exploitation de ces opérations ou fausserait leurs résultats.

Solicitor-client privilege

23. The head of a government institution may refuse to disclose any record requested under this Act that contains information that is subject to solicitor-client privilege.

Secret professionnel des avocats

23. Le responsable d'une institution fédérale peut refuser la communication de documents contenant des renseignements protégés par le secret professionnel qui lie un avocat à son client.

Statutory Prohibitions

Interdictions fondées sur d'autres lois

Statutory prohibitions against disclosure

24. (1) The head of a government institution shall refuse to disclose any record requested under this Act that contains information the disclosure of which is restricted by or pursuant to any provision set out in Schedule II.

Interdictions fondées sur d'autres lois

24. (1) Le responsable d'une institution fédérale est tenu de refuser la communication de documents contenant des renseignements dont la communication est restreinte en vertu d'une disposition figurant à l'annexe II.

Review of statutory prohibitions by Parliamentary committee

(2) Such committee as may be designated or established under section 75 shall review every provision set out in Schedule II and shall, within three years after the coming into force of this Act or, if Parliament is not then sitting, on any of the first fifteen days next thereafter that Parliament is sitting, cause a report to be laid before Parliament on whether and to what extent the provisions are necessary.

Examen des dispositions interdisant la communication

(2) Le comité prévu à l'article 75 examine toutes les dispositions figurant à l'annexe II et dépose devant le Parlement un rapport portant sur la nécessité de ces dispositions, ou sur la mesure dans laquelle elles doivent être conservées, dans les trois ans qui suivent l'entrée en vigueur de la présente loi, ou, si le Parlement ne siège pas, dans les quinze premiers jours de séance ultérieurs.

Severability

25. Notwithstanding any other provision of this Act, where a request is made to a government institution for access to a record that the head of the institution is authorized to refuse to disclose under this Act by reason of information or other material contained in

Prélèvements

25. Le responsable d'une institution fédérale, dans les cas où il pourrait, vu la nature des renseignements contenus dans le document demandé, s'autoriser de la présente loi pour refuser la communication du document, est cependant tenu, nonobstant les autres

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April 30, 1992

U.S. CIGARETTE IMPORTS IN PACIFIC RIM COUNTRIES

SMALL PLAYERS IN BIG MARKETS

Antismoking advocates portray U.S. cigarette manufacturers as looming giants in seven Pacific Rim countries–Hong Kong, Indonesia, Japan, Malaysia, Korea, Taiwan and Thailand. The facts are these:

- *Tobacco is an established industry in each of the seven Pacific Rim countries, independent of foreign manufacturers.*

As the attached tables show, tobacco farming–leaf production–is a mainstay of the economies of each of these countries, with the exception of Hong Kong. Just as in the United States, leaf exports are a source of substantial revenue to most of these countries. In Thailand and South Korea, leaf exports dwarf leaf imports. Thailand exports nearly one-half of its leaf production. South Korea exports nearly one-third of its leaf production.

According to the most recent available published sources, each country derives substantial cigarette and other tobacco product excise tax revenues (in U.S. dollars)–

Hong Kong:	$	229.7	million in 1991
Indonesia:	$	752.0	million in 1989
Japan:	$	12,740.0	million in 1989
Malaysia:	$	600.0	million in 1985
South Korea:	$	2,000.0	million in 1990
Taiwan:	$	442.0	million in 1987
Thailand:	$	480.0	million in 1989

- *State tobacco monopolies, wholly owned by the government, dominate the markets in Japan, Taiwan, South Korea and Thailand.*

In 1990, according to the sources cited in the attached pie charts, Japan Tobacco held approximately **83.3** percent of the Japanese market, the Taiwan monopoly held **85.9** percent of the Taiwanese market, the South Korean monopoly held **95.6** percent of the South Korean market, and the Thailand monopoly held virtually **100** percent of the market before the ban on imports was relaxed in November 1991.

The Thailand Tobacco Monopoly increased its cigarette production by nearly 30 percent between 1984 and 1989. *World Cigarette Market: The 1990 Inter-*

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Source: https://www.industrydocuments.ucsf.edu/docs/xphl0000

national Survey, ERC Statistics International Limited. TTM currently has four factories operating at full capacity–100 million pieces a day total–and plans to expand production by 50 percent within the next two-to-three years. TTM also has said that it plans to export cigarettes "throughout Southeast Asia . . . and Russia. And we think we have the opportunity to penetrate Europe." *Tobacco Reporter*, January 1991, p. 36.

In March of 1992, the Taiwan monopoly likewise said that it planned to expand its production capacity, and earlier this month, Japan Tobacco announced that it had acquired **The Manchester Tobacco Ltd.** of Britain for $8.6 million in order to expand business overseas. The annual report for JTI for the year ended March 31, 1991, shows annual sales of $21 billion and an export business that reached into 33 countries. According to the report, Japanese cigarette exports grew from 1.5 billion pieces in 1987 to 7.5 billion pieces in 1991–a five-fold increase.

- ***The markets are locally dominated even in the non-monopoly countries, with the sole exception of Hong Kong.*** As the attached tables show:

The Indonesian market is dominated by local brands produced by Indonesian kretek and cigarette manufacturers. In 1990, U.S. brands had less than a one-percent share of the Indonesian market. Malaysia requires that cigarettes sold in that country be **70 percent** local tobacco, and this domestic-content requirement will increase to **85 percent** by 2000. (The Office of the U.S. Trade Representative, in its 1992 National Trade Estimate Report on Foreign Trade Barriers, characterizes Malaysia's import duties on tobacco leaf as "prohibitive.") Hong Kong, which has long been the only free market country among the seven, is the only country in which the market share of U.S. brands exceeds 50 percent.

- ***Foreign cigarette manufacturers–including U.S. companies–are minor players in the Pacific Rim markets, with the exception of Hong Kong.*** As the attached pie charts show, U.S. brands in 1990 accounted for only a small fraction of the cigarettes consumed in each of these countries, with the sole exception of Hong Kong. (Although U.S. brands are shown as having a 25 percent market share in Malaysia, as noted Malaysia requires that cigarettes sold in that country be 70 percent local tobacco.)

In Japan, 16 percent market share
In Taiwan, 9 percent market share
In South Korea, 2 percent market share
In Thailand, 0 percent market share
In Indonesia, .9 percent market share

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Source: https://www.industrydocuments.ucsf.edu/docs/xphl0000

In Malaysia, 25 percent market share
In Hong Kong, 74 percent market share

- **Cigarette and leaf tobacco exports make a major contribution to the U.S. trade balance.** In fact, tobacco is one of the few American industrial categories that managed to maintain and increase its foreign trade surplus during the 1980's and 1990's.

In 1991, cigarette and leaf exports produced a $4.8 billion net trade surplus. The industry's FY1991 trade balance accounted for 37.4 percent of the nation's overall agricultural trade surplus. Between 1981 and 1991, while the U.S. trade deficit ballooned from $27.5 billion to $152.1 billion (in 1987) and stood at $66.3 billion in 1991, tobacco exports increased by more than $2.6 billion. [Source: Tobacco Merchants Association *Tobacco Trade Barometer*; Bureau of Census, Foreign Trade Division]

Tobacco exports help to reduce the U.S. trade deficit with the seven Pacific Rim countries. In 1991, as in other recent years, those deficits were substantial and would have been even greater–but for the U.S. tobacco industry.

1991 U.S. Trade Deficit
(in U.S. dollars)

Hong Kong:	$	1.1 billion
Indonesia:	$	1.3 billion
Japan:	$	43.4 billion
Malaysia:	$	2.2 billion
South Korea:	$	1.5 billion
Taiwan:	$	7.8 billion
Thailand:	$	2.4 billion

[Source: Office of U.S. Trade Representative, 1992 National Trade Estimate Report on Foreign Trade Barriers]

- ***The introduction of U.S. cigarettes in Japan, Taiwan and South Korea has not caused increased smoking in those countries.*** As the attached tables show, apart from normal fluctuations, cigarette consumption in Japan has not changed significantly in the last decade, even though U.S. cigarettes became widely available in 1987. In Taiwan and South Korea, total sales volumes were increasing before U.S. cigarettes became available and continued to increase after U.S. cigarettes became available. Indeed, the rate of increase slowed following the opening of these markets. In all three countries, all that occurred was a switch among consumers from domestic brands to U.S. brands. Even so, the domestic tobacco monopolies continued to dominate the markets.

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Source: https://www.industrydocuments.ucsf.edu/docs/xphl0000

HONG KONG

Tobacco Leaf Production (in metric tons)							
	1984	1985	1986	1987	1988	1989	1990
Leaf Production	0	0	0	0	0	0	0
Leaf Exports (1)	6531	4228	1147	309	1252	1880	3473
Leaf Imports	16849	17039	11790	15327	21723	20110	34610

Note (1) Re-Exported Leaf.

INDONESIA

Tobacco Leaf Production (in metric tons)							
	1984	1985	1986	1987	1988	1989	1990
Leaf Production	103182	122814	130995	130917	117108	124921	131343
Leaf Exports	19317	19792	23092	18694	18240	17722	17402
Leaf Imports	14989	10212	9825	10762	10845	13631	26647

JAPAN

Tobacco Leaf Production (in metric tons)							
	1984	1985	1986	1987	1988	1989	1990
Leaf Production	121925	104588	106396	93961	77213	66957	72487
Leaf Exports	3215	3200	12000	18960	2500	1500	0
Leaf Imports	69700	70000	66300	75985	68300	64000	81400

Source: Foreign Agricultural Service–U.S. Department of Agriculture

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Source: https://www.industrydocuments.ucsf.edu/docs/xphl0000

MALAYSIA

Tobacco Leaf Production (in metric tons)							
	1984	1985	1986	1987	1988	1989	1990
Leaf Production	6532	8534	12320	10078	6730	12485	9892
Leaf Exports	1	1	10	44	227	16	9
Leaf Imports	4212	5412	5198	3386	3048	3502	4463

SOUTH KOREA

Tobacco Leaf Production (in metric tons)							
	1984	1985	1986	1987	1988	1989	1990
Leaf Production	63009	51330	55641	50725	65697	70579	59591
Leaf Exports	30009	23283	24423	22325	26916	20268	18367
Leaf Imports	2800	837	3884	3371	5685	6471	7076

TAIWAN

Tobacco Leaf Production (in metric tons)							
	1984	1985	1986	1987	1988	1989	1990
Leaf Production	19766	18190	21752	21677	19258	17653	17788
Leaf Exports	1629	5678	986	1784	17294	4115	2504
Leaf Imports	11519	15730	12882	7568	11449	22834	13678

Source: Foreign Agricultural Service–U.S. Department of Agriculture

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Source: https://www.industrydocuments.ucsf.edu/docs/xphl0000

THAILAND

Tobacco Leaf Production (in metric tons)							
	1984	1985	1986	1987	1988	1989	1990
Leaf Production	74643	70330	60442	62391	54462	60245	70898
Leaf Exports	35500	31615	30315	26953	30945	27247	34549
Leaf Imports	6947	8736	9288	3374	5724	7515	9180

Source: Foreign Agricultural Service–U.S. Department of Agriculture

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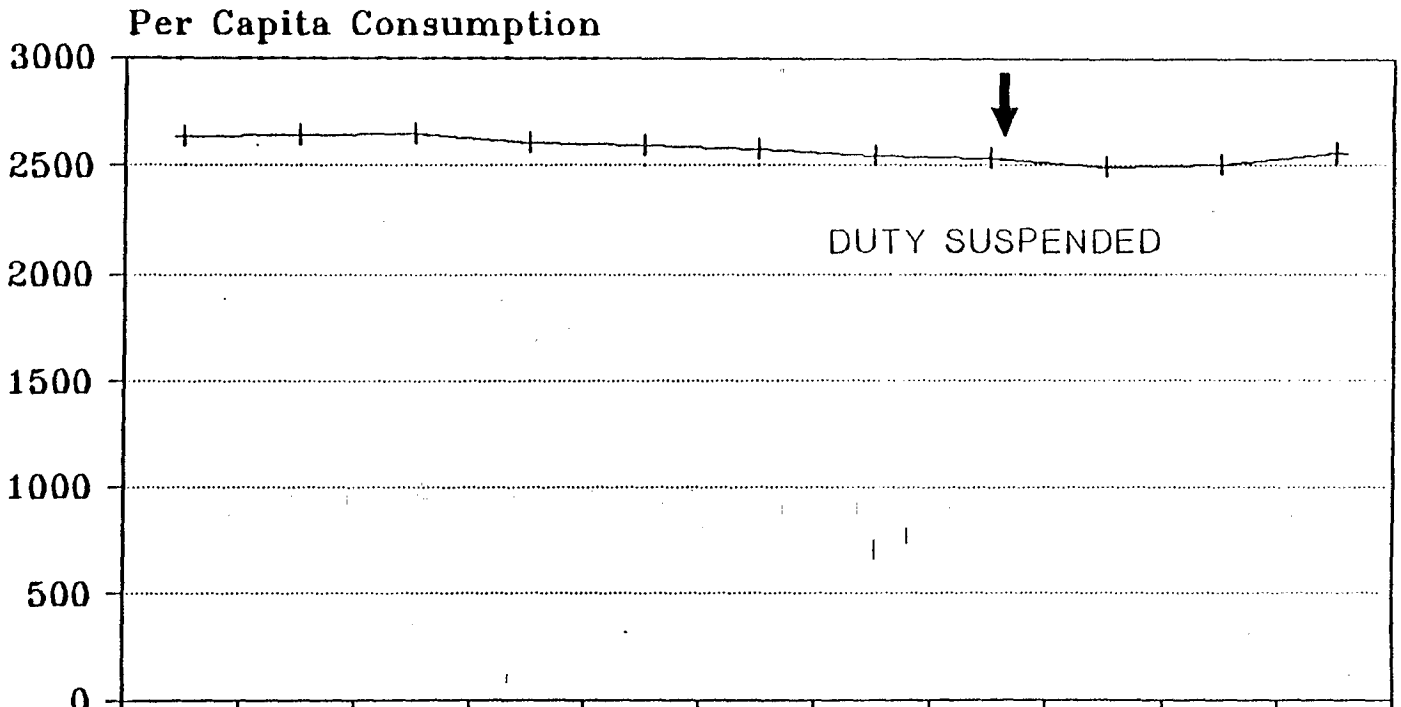
Source: https://www.industrydocuments.ucsf.edu/docs/xphl0000

JAPAN
PER CAPITA CONSUMPTION



	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Y	2631	2636	2640	2603	2591	2574	2542	2527	2491	2501	2552

Year

Consumption: US Dept of Agriculture
Population: United Nations

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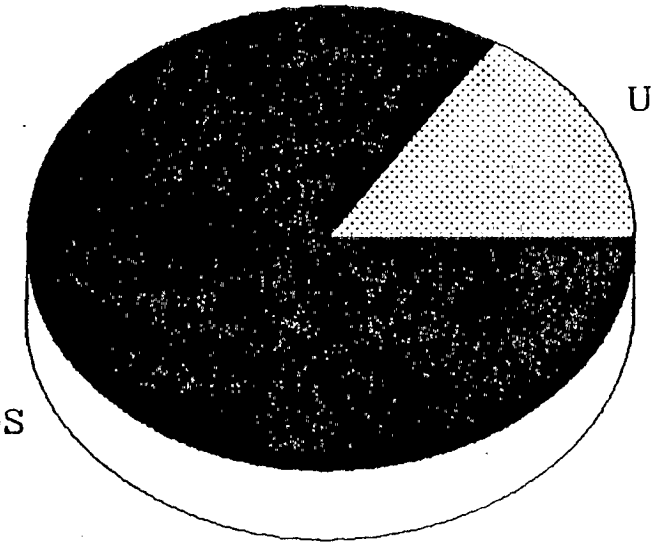
Source: https://www.industrydocuments.ucsf.edu/docs/xphl0000

JAPAN
1990 MARKET SHARE – U.S. BRANDS*



* Cigarettes using trademarks of U.S. brands either manufactured in the U.S. or locally

Source: Tobacco Institute of Japan (govt monopoly is principal member)

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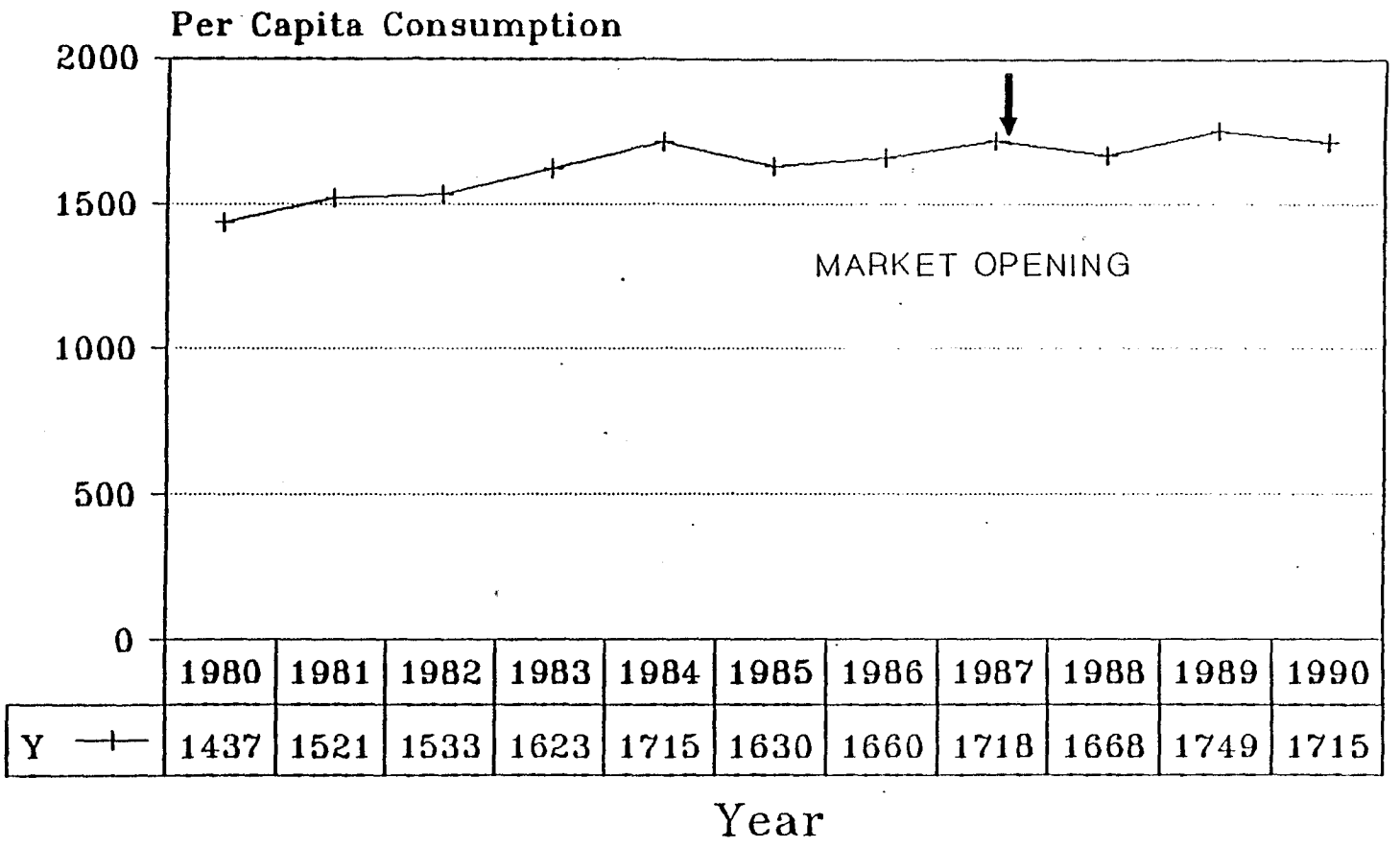
Source: https://www.industrydocuments.ucsf.edu/docs/xphl0000

TAIWAN
PER CAPITA CONSUMPTION



Consumption: US Dept of Agriculture
Pop:1980–88 Taiwan Statistical Data Book
1989–91 Bulletin of Statistics ROC

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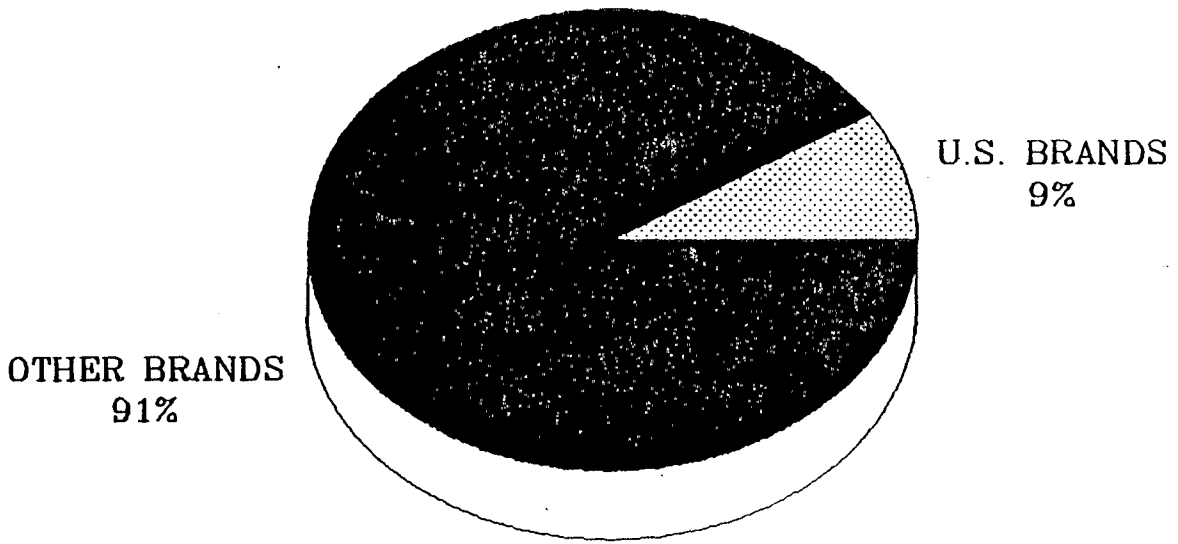
Source: https://www.industrydocuments.ucsf.edu/docs/xphl0000

TAIWAN
1990 MARKET SHARE – U.S. BRANDS*



* Cigarettes using trademarks of U.S. brands manufactured in the U.S.

Source: Taiwan Customs Department

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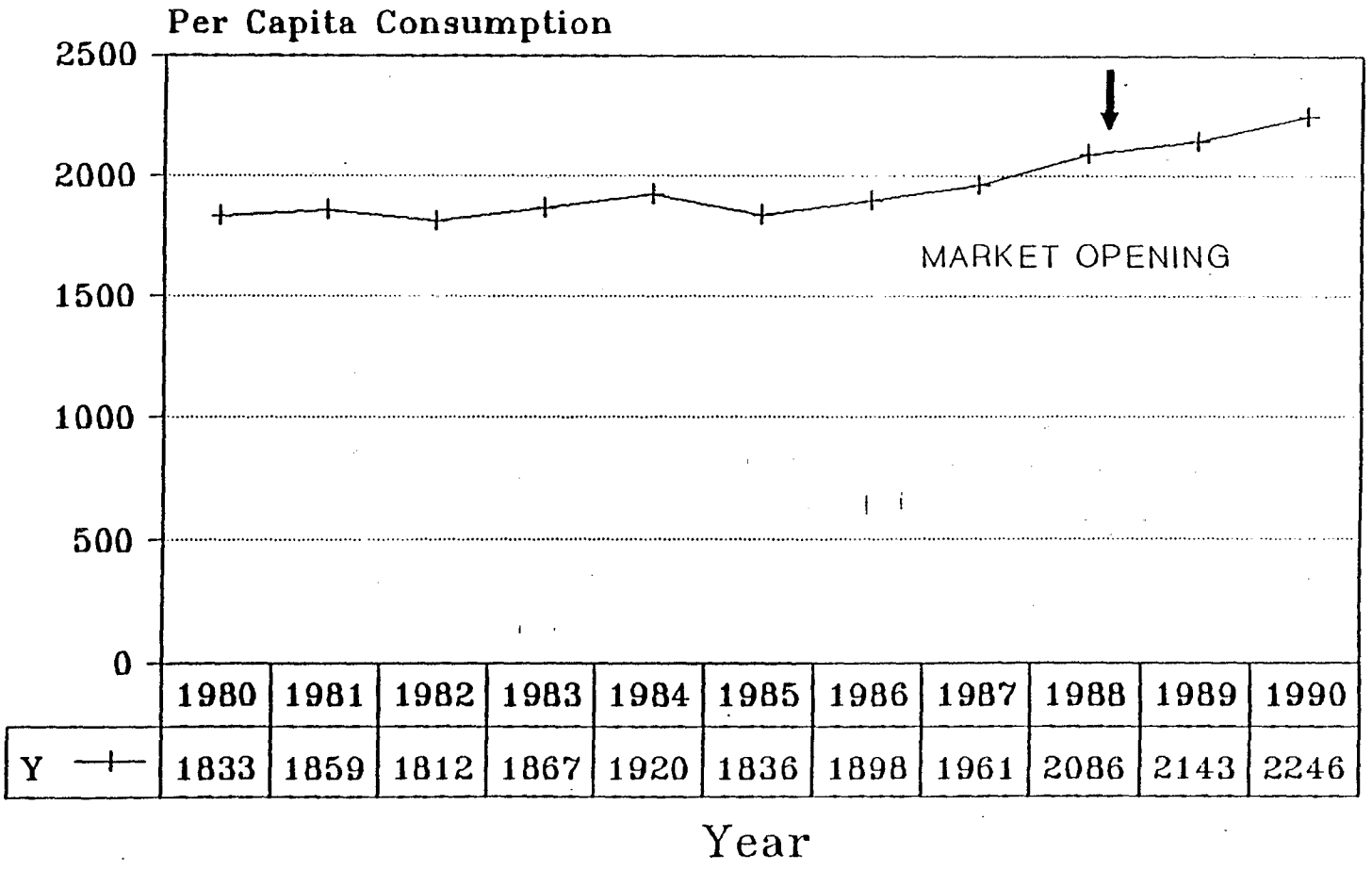
Source: https://www.industrydocuments.ucsf.edu/docs/xphl0000

KOREA
PER CAPITA CONSUMPTION



Consumption: US Dept of Agriculture
Population: United Nations

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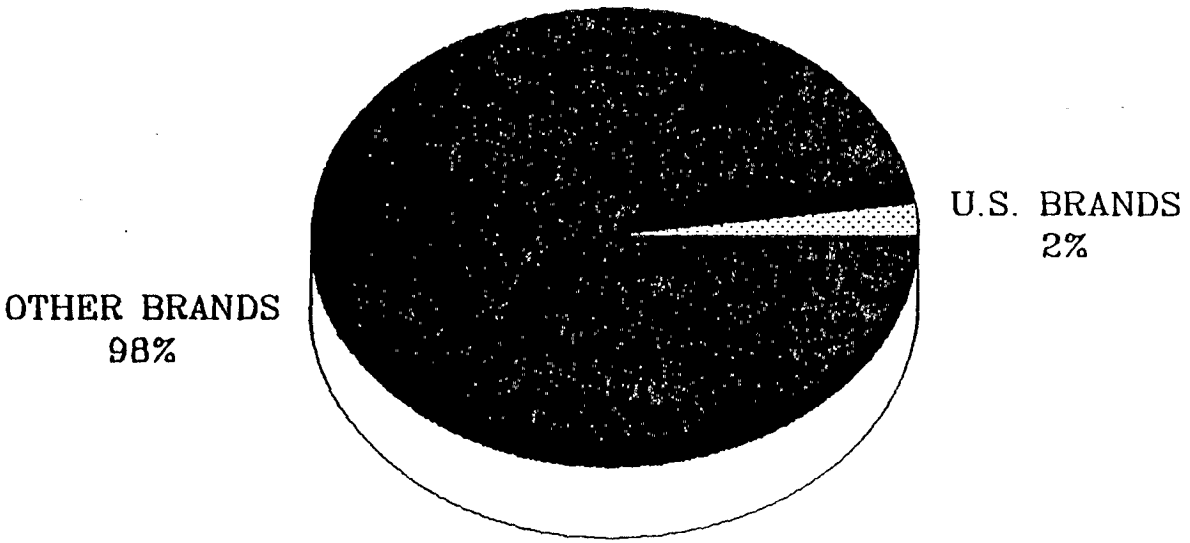
Source: https://www.industrydocuments.ucsf.edu/docs/xphl0000

KOREA
1990 MARKET SHARE – U.S. BRANDS*



* Cigarettes using trademarks of U.S. brands manufactured in the U.S.

Source: Korean Industry Data Exchange

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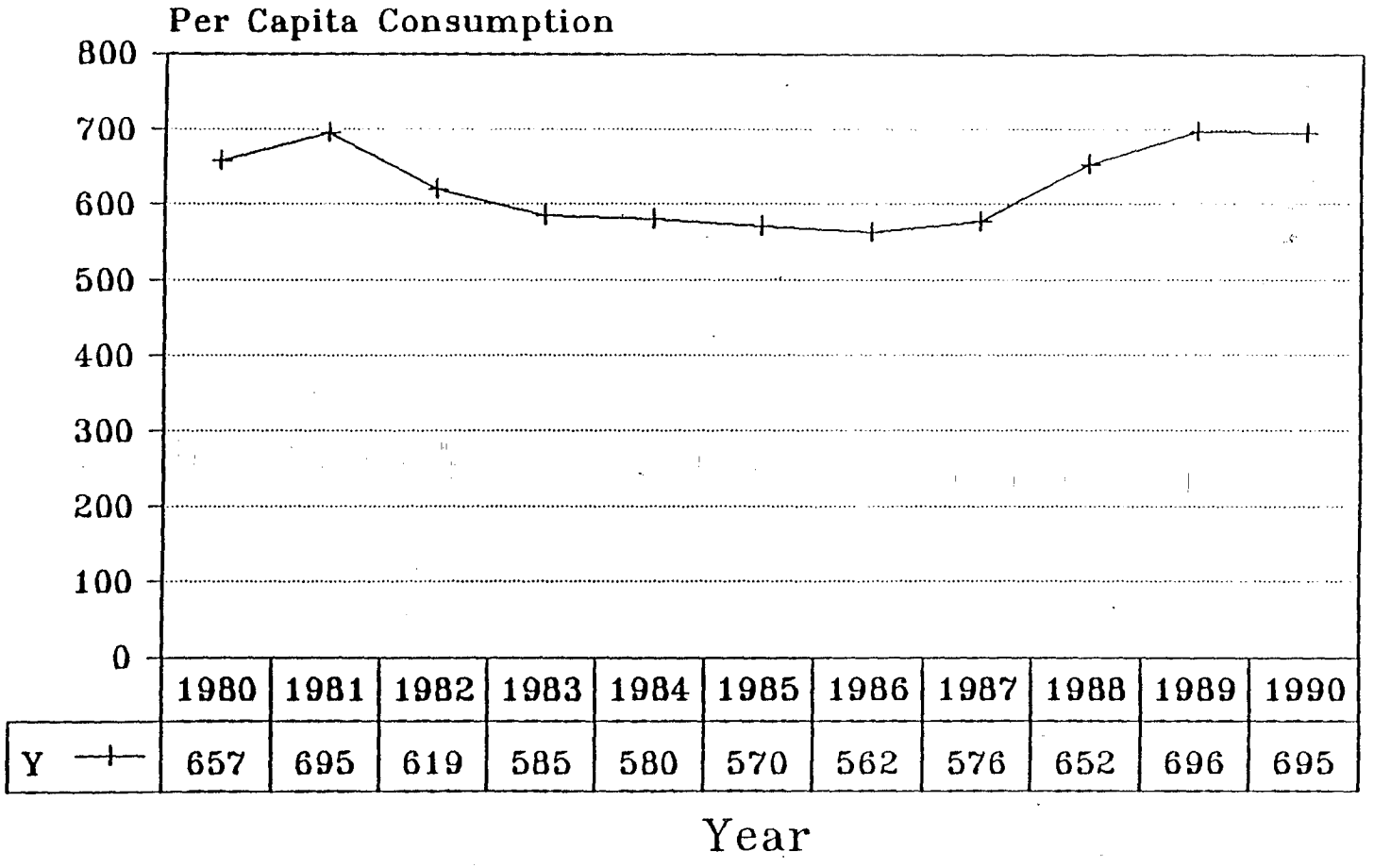
Source: https://www.industrydocuments.ucsf.edu/docs/xphl0000

THAILAND
PER CAPITA CONSUMPTION



Consumption: US Dept of Agriculture
Population: United Nations

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Source: https://www.industrydocuments.ucsf.edu/docs/xphl0000

THAILAND
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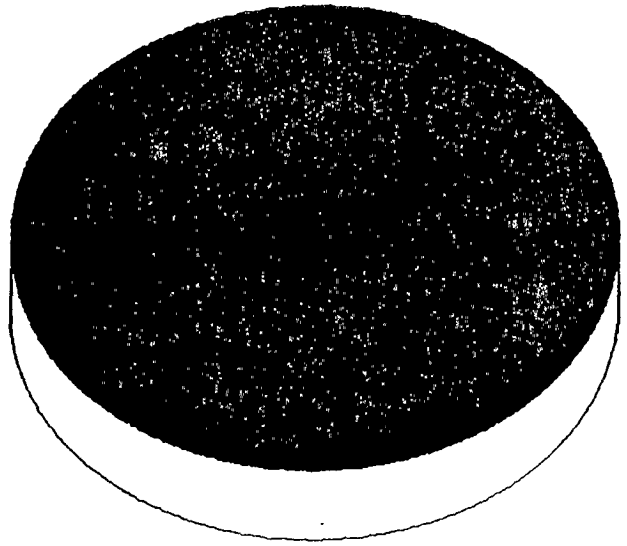

* Cigarettes using trademarks of U.S. brands manufactured in the U.S.

Source: Thailand Industry Data Exchange

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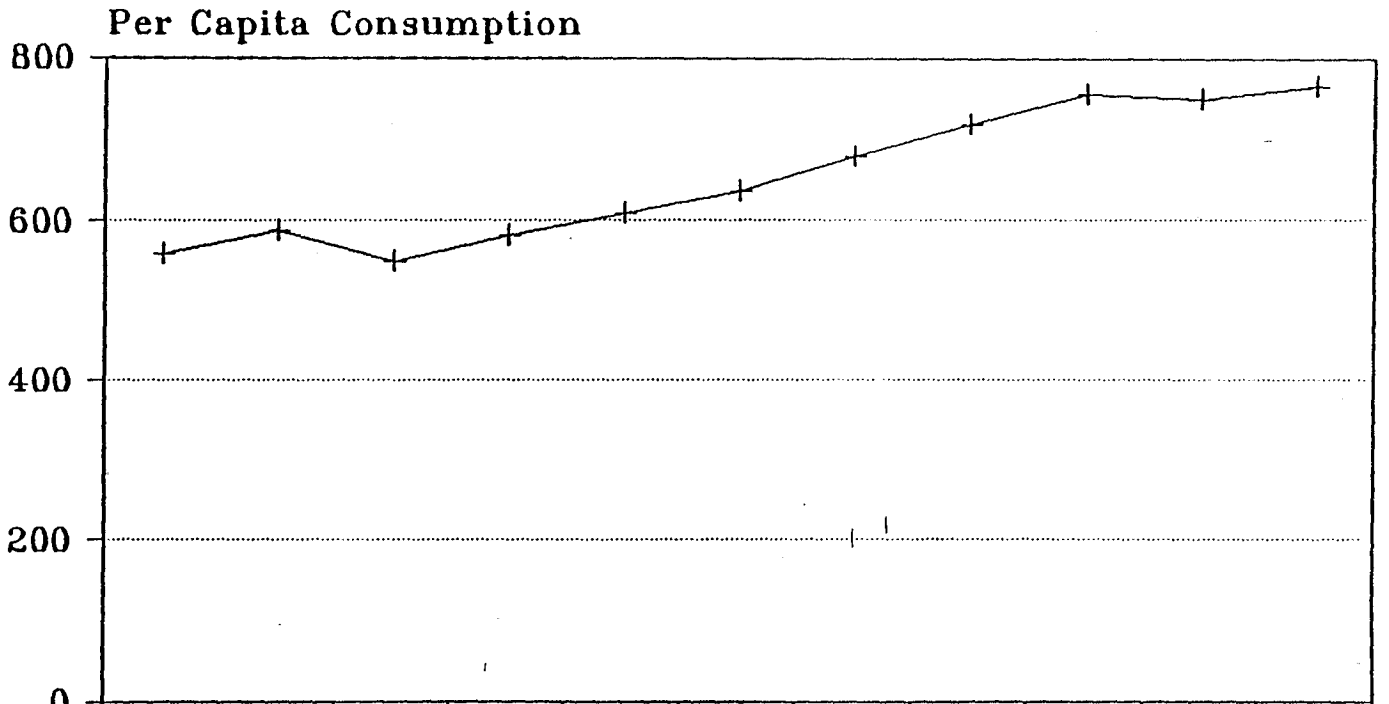
Source: https://www.industrydocuments.ucsf.edu/docs/xphl0000

INDONESIA
PER CAPITA CONSUMPTION



	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Y	559	587	550	581	609	635	677	717	755	748	765

Year

Consumption: US Dept of Agriculture
Population: United Nations

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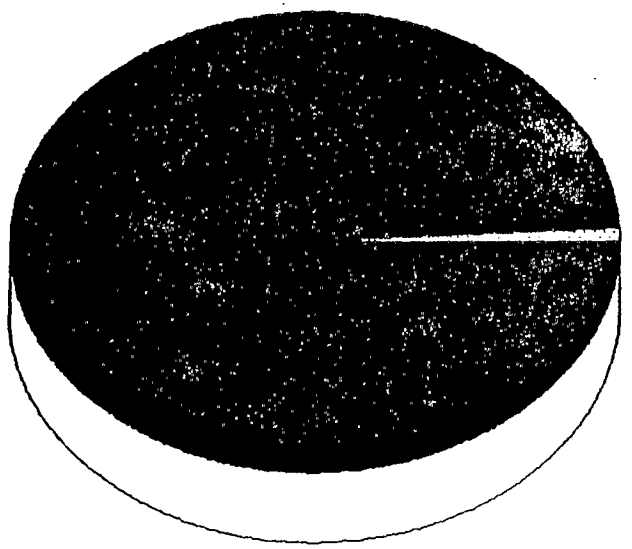
Source: https://www.industrydocuments.ucsf.edu/docs/xphl0000

INDONESIA
1990 MARKET SHARE – U.S. BRANDS*



* Cigarettes using trademarks of U.S. brands either manufactured in the U.S. or locally

Source: Indonesian Government

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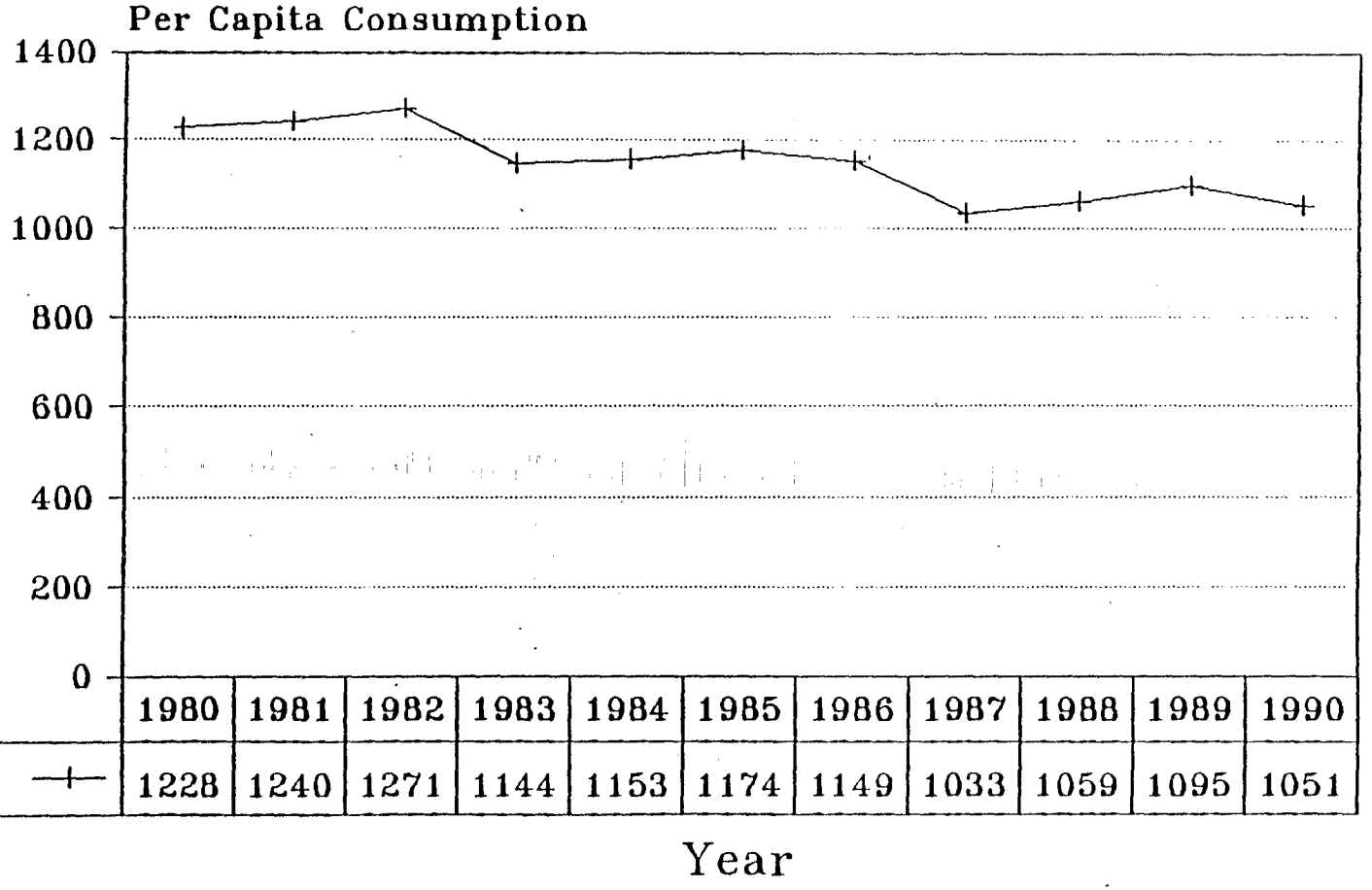
Source: https://www.industrydocuments.ucsf.edu/docs/xphl0000

MALAYSIA
PER CAPITA CONSUMPTION



Consumption: US Dept of Agriculture
Population: United Nations

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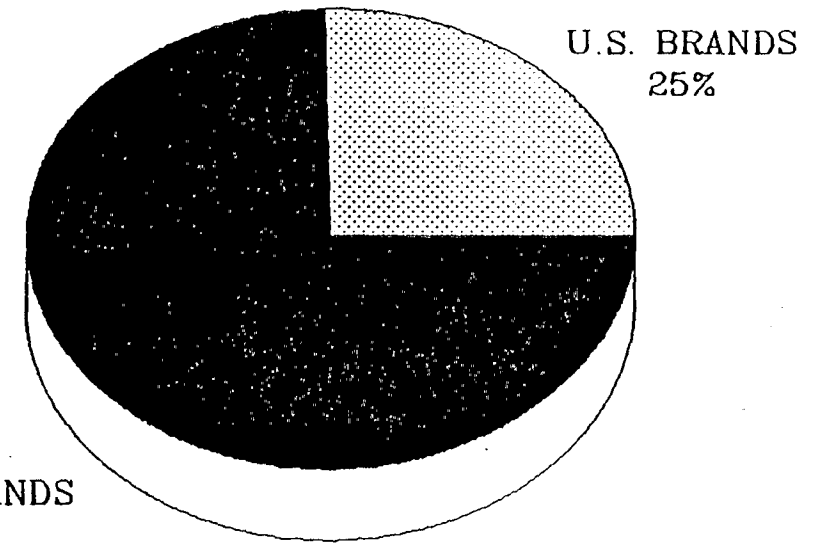
Source: https://www.industrydocuments.ucsf.edu/docs/xphl0000

MALAYSIA
1990 MARKET SHARE – U.S. BRANDS*



* Cigarettes using trademarks of U.S. brands either manufactured in the U.S. or locally

Source: Malaysian Industry Data Exchange

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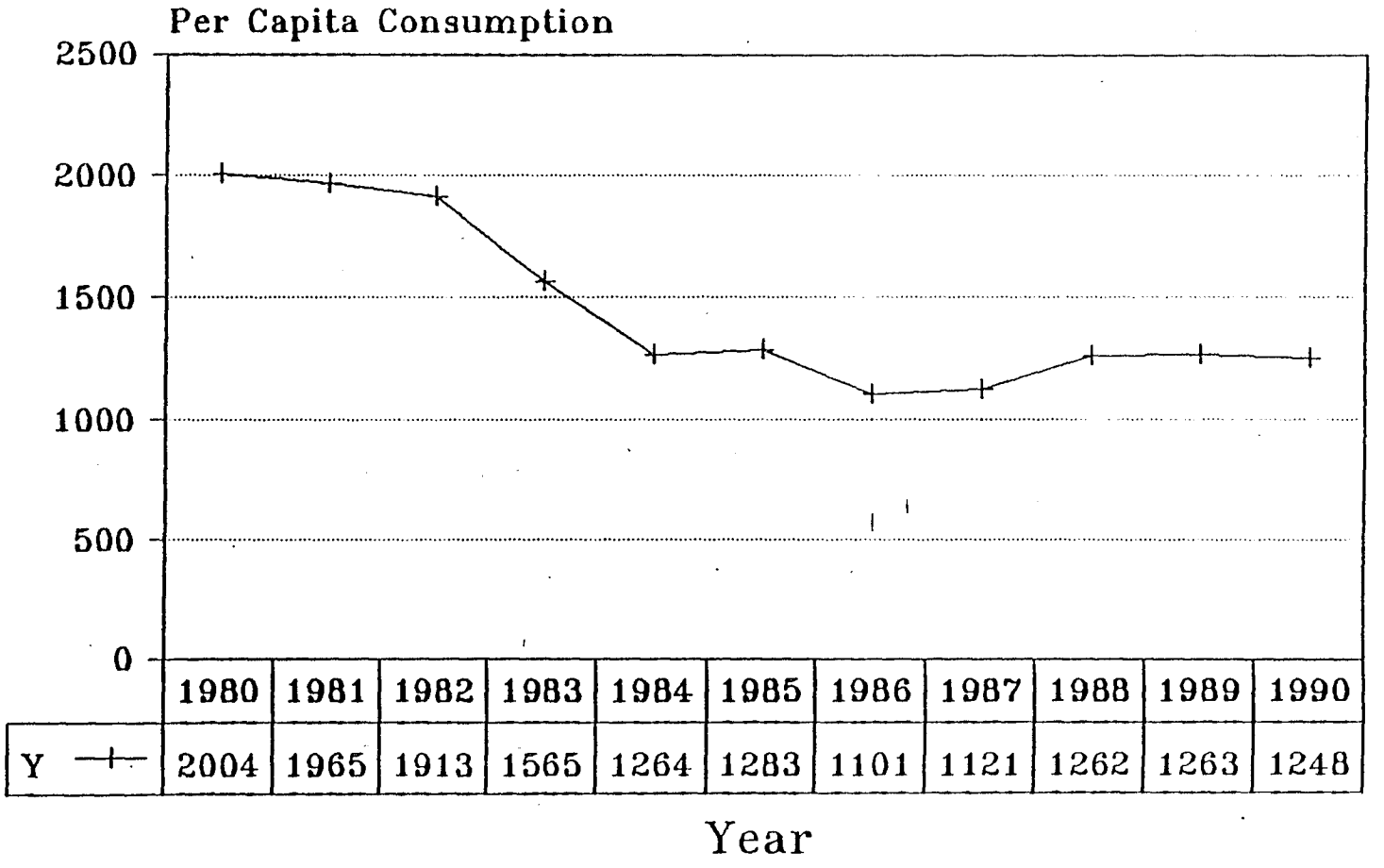
Source: https://www.industrydocuments.ucsf.edu/docs/xphl0000

HONG KONG
PER CAPITA CONSUMPTION



Consumption: US Dept of Agriculture
Population: United Nations

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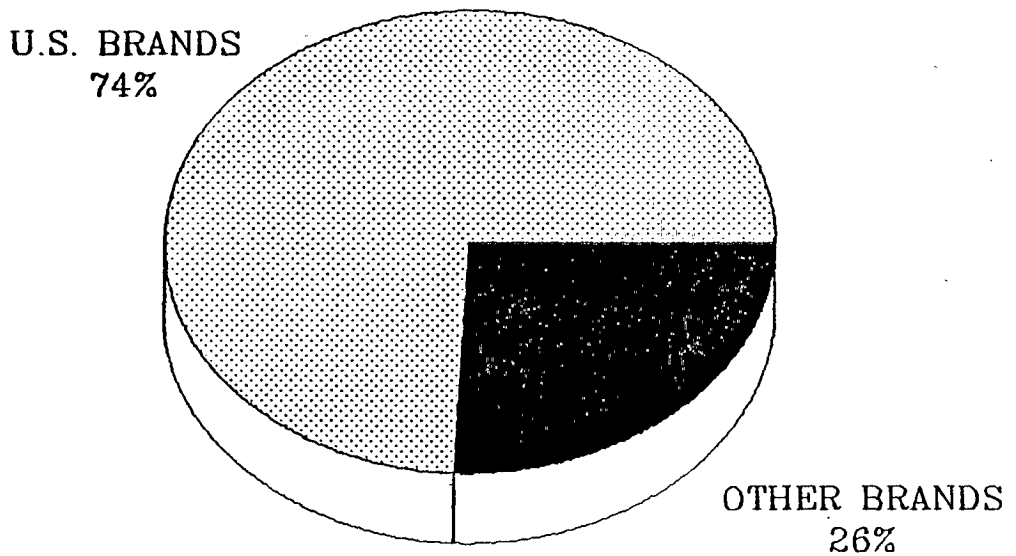
Source: https://www.industrydocuments.ucsf.edu/docs/xphl0000

HONG KONG
1990 MARKET SHARE – U.S. BRANDS*



* Cigarettes using trademarks of U.S. brands either manufactured in the U.S. or locally

Source: Hong Kong Tobacco Institute & Industry Data Exchange

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Discussion Paper Series

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TOBACCO IN DEVELOPING COUNTRIES: AN ECONOMIC APPROACH TO POLICY FORMULATION

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March 1988
S-88-19

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PRODUCTION ORIENTED POLICIES 74
The Current Situation 78
Tobacco and the Price of Cigarettes 80
Subsidy of Tobacco Production 83
Externalities in Production 89
Policy Options 97

SHOULD TOBACCO PRODUCTION BE ENCOURAGED?.....100

RECOMMENDATIONS.....104

TABLES 115

NOTES 124

REFERENCES 126

APPENDIX 131

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Tobacco in Developing Countries: An Economic Approach to Policy Formulation

by

Eugene M. Lewit, Ph.D.

UMDNJ - New Jersey Medical School

National Bureau of Economic Research

February 1987

CONTENTS

INTRODUCTION 1

TRENDS IN TOBACCO PRODUCTION AND CONSUMPTION 2
Trends in Cigarette Consumption.....5

HEALTH EFFECTS OF TOBACCO USE 7
Costs of Smoking 9
Fires 18

RATIONALE FOR GOVERNMENT INTERVENTION 19
Externalities 21
Lack of Risk Awareness 24
Dependency/Addiction 26
Children 28

POLICY INSTRUMENTS TO REDUCE DEMAND 30
Informational Strategies 30
Health Warnings 34

RESTRICTIONS ON ADVERTISING 36
Effects of Advertising Bans 43
Educational Programs 47
Conclusions and Recommendations 51

TAXES ON CONSUMPTION 54
Effects of Taxes on Consumption 58
Rationale for a Tax Policy 60
Limitations of a Tax Policy 62
Conclusions and Recommendations 64

LIMITATIONS ON SALES AND CONSUMPTION 70
Conclusions and Recommendations 72

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SUMMARY

This paper examines tobacco control policies for less developed countries. The need for tobacco policy arises because tobacco consumption is an important cause of illness and premature death. Tobacco consumption, primarily as manufactured cigarettes, increased steadily in developed countries in the first half of this century but appears to have peaked and to be declining. Tobacco consumption in less developed countries (LDC's) seems to be increasing, although the situation varies by country. Concern about the health consequences of tobacco consumption in LDC's has sparked calls for appropriate tobacco control policies in these countries. Although it is likely that increases in tobacco consumption in LDC's will have a deleterious effect on health, little is known about the quantitative impact of tobacco and even less about the costs and consequences of various tobacco control policies in these countries. Accordingly, this paper, drawing where possible on evidence from less developed countries, develops an economic framework to evaluate tobacco policies and discusses different policy options based largely on experience in the more developed world.

The neo-classical welfare economics framework is employed to examine a variety of policy options affecting both the demand for and supply of tobacco products. This framework is useful in this context because it is designed to help evaluate choices between various alternatives when not all desirable ends are simultaneously obtainable. A basic tenet of this approach is that given information about product characteristics and prices, consumers will make purchases so as to maximize their well-being. Where markets function well and consumers make optimal decisions, it may be that some consumers will engage in risky activities such as smoking, but there will be little cause for government intervention. The need for government intervention arises, however, when several basic conditions of the optimizing process breakdown. It is argued that such breakdowns occur in the market for tobacco products because of 1) a lack of provision of information on the dangers of smoking; 2) externalities that arise because of the interplay of tobacco use and the social system; 3) the addictive nature of tobacco use; 4) the need to protect non-smokers including children; and 5) subsidies to tobacco production and taxes on tobacco consumption which constrain responses in markets for tobacco.

Among the demand oriented policies discussed are those intended to increase consumer awareness of the dangers of tobacco use. These include requiring that tobacco products carry warning labels, restricting tobacco advertising and promotion, and educating the public to the dangers of tobacco use. All three have the potential to redress the problem of consumers being inadequately informed about the dangers of

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tobacco use. The advantages and disadvantages of the three policies are discussed and it is concluded that there is reasonable justification for warning labels and advertising restrictions. There is also reason to believe that health education might be very effective, but as public health education programs might require the reallocation of very scarce resources in certain countries, they are best evaluated on a case by case basis.

High levels of taxation on tobacco products would also discourage their consumption. Taxes can also redress the externalities that arise if tobacco users do not bear the full costs of the deleterious effects of tobacco use because social insurance schemes spread these costs indiscriminately among non-smokers as well as smokers. The evidence examined suggests that it may be difficult to determine an appropriate level of tobacco taxation for a particular country because: 1) information on the extent of the uncompensated externalities associated with tobacco use in LDC's is limited; 2) high tax policies are paternalistic and impose added burdens on smokers; 3) high tax policies create problems of enforcement; and 4) high tax policies may create a dependency by government on the tobacco sector that may work against other tobacco policies.

Restrictions on sales to minors and on cigarette consumption are also attractive policies designed to address specific concerns. While such legal restrictions have been legislated in many developed countries, there is little information on their impact or on the cost of their enforcement. Accordingly, little can be said about their value in LDC's.

It has been asserted elsewhere that attention should be directed to tobacco production in order to effectively cope with the problems of tobacco use. It is argued, however, that the local production of tobacco is not necessary for its consumption and that because of the high level of taxation on many tobacco products there is frequently little relationship between the cost of tobacco and the retail price of tobacco products.

Concerns about the production side of the tobacco market arise primarily because of the substantial subsidies provided tobacco growers in many countries. Subsidies are provided by national governments and major tobacco manufacturers. In addition, U.S. agricultural policy which restrains U.S. tobacco production keeps the price of tobacco artificially high in world markets. Because of these subsidies, tobacco production is very profitable in many areas of the less developed world and these sources of supply are being developed. Concern is expressed about the political implication of developing subsidized tobacco sectors as this can lead to aggressive "rent seeking" behavior by producers

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who will attempt to protect their advantage. This behavior may make the implementation of appropriate tobacco demand policies difficult in a number of countries.

The various subsidies only benefit the producers at the expense of consumers. From a larger perspective, there is no net gain. Moreover, the continuation of current subsidy arrangements are largely dependent on developments in the U.S. and China (the largest tobacco producers) and on the continued demand for imported tobacco in developed countries. Accordingly, while increased tobacco production may appear profitable in the short run, the advantage can fade quickly.

The production of tobacco carries an environmental risk in some developing countries. This results from the use of wood for tobacco curing in countries where the threat of deforestation is considerable. While this problem is limited to certain countries, the environmental impact of deforestation leading to soil erosion and eventual desertification can be catastrophic. It is argued that deforestation results from a tendency to undervalue wood. In particular, in many countries, wood seems to be valued by the cost of gathering rather than by the cost of maintaining a steady supply. This undervaluing of wood leads to its inefficient use and makes the production of wood-cured tobacco appear more profitable than it actually is. Since policies designed to reforest areas without modifying behavior may only exacerbate the problem, it is suggested that tobacco growers (and other users of wood) be required to provide for their own needs. This will not only help control deforestation directly but by causing wood to be more fully valued, lead to a modification in production practices, perhaps ultimately reducing the profitability and supply of tobacco.

The paper concludes with several specific recommendations, including: 1) all tobacco products should be labelled with health warnings; 2) advertising of tobacco products should be restricted or abolished; 3) appropriate health education programs need to be implemented; 4) tobacco taxes have an important policy function but determining the appropriate level of taxation is difficult; 5) there appears to be little justification for encouraging tobacco production; 6) alleviation of the environmental impact of tobacco production should be accomplished by modifying the incentives facing producers; 7) high priority areas for further research include a cross-national, multivariate study of the relationship between tobacco use and tobacco policy in a sample of LDC's and a study of the impact of tobacco use on health care costs in specific LDC's. Ultimately, tobacco policy will have to reflect individual circumstances on a country by country basis.

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INTRODUCTION

Since almost the beginning of its recorded history, tobacco has provoked controversy and attempts to control its use (Mackenzie, 1986). Despite these efforts, the demand for tobacco in its many forms, cigarettes, cigars, pipe, snuff and chewing has grown steadily. With this growth there has accumulated a substantial body of evidence indicting tobacco as a significant cause of disease and premature death. Today, tobacco use is under attack in many developed countries and if its consumption is not declining in all cases, at least the steady growth in consumption has flagged. In less developed countries, the evidence of particular trends in tobacco use and its consequences are less clear. Still, because of the heavy toll of tobacco induced illnesses experienced in the developed world, attention is increasingly being paid to developments in the less developed countries (World Health Organization, 1986).

This paper addresses the issue of appropriate tobacco policies for less developed countries (LDC'S) based largely on the experience of the more developed world. The reason for this focus is that there is limited information available about the impact of tobacco in less developed countries and even less is known about the costs and consequences of tobacco control policies in these countries. Evidence from less developed countries is used where available and relevant

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however. In addition, several issues on the production side which are relatively unique to some less developed countries are discussed.

The paper begins with a brief overview of current trends in tobacco consumption and production and a brief discussion of the health consequences of tobacco use. The rationale for government policy is then discussed within the context of neo-classical welfare economics. Issues surrounding policy instruments intended to reduce the demand for cigarettes are then explored. As the question of whether tobacco production in LDC's should be enough appears to be of prime importance, production related policies are also examined. Finally, a number of specific recommendations are discussed.

TRENDS IN TOBACCO PRODUCTION AND CONSUMPTION

Emotions tend to run high when discussing the tobacco industry and the health consequences of tobacco use. In such situations useful information is sometimes ignored in an attempt to make a dramatic statement. Because generalizations frequently do not yield policies appropriate for different situations, this section highlights aspects of the diverse world wide tobacco situation as background to the discussion of specific policies.

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Table 1 contains information on per capita consumption of manufactured cigarettes in many countries in the world. While the numbers speak for themselves, understanding the situation in individual countries frequently requires interpretation. There is wide variation in manufactured cigarette consumption with per capita consumption in the top five countries almost 60 times consumption in the bottom five. The following considerations, however, enter into the interpretation of these ratios:

1) Demographic and Gender Factors: In almost all countries, men are more likely to smoke than women and male smokers tend to smoke more heavily than women. However, this distinction is much more pronounced in many LDC's where very few women smoke. Accordingly, in these countries per capita consumption rates may understate male consumption by almost 50%. For example, because only 1% of the female population of Egypt smoke cigarettes, the consumption of cigarettes by males in Egypt is nearly twice the value in Table 1 or 1750 per male, close to the value for the United Kingdom where men and women are almost equally likely to smoke. A similar statistical aberration arises with regard to the age distribution of the population. Typically children under 15 years of age do not smoke or smoke many fewer cigarettes than adults. In many LDC's, children under 15 years old account for 40-50% of the population. In developed countries, on the

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other hand, this group may only account for 20% to 25% of the population. Accordingly, per capita consumption ratios may understate smoking by adults in some less developed countries by 30-40% as compared with developed countries.

2) Other Forms of Tobacco Consumption: There are many other forms of tobacco consumption which vary in popularity by country. Most important of these are chewing tobacco in many Asian countries, smoking water pipes in the Middle East and smoking of roll-your-own cigarettes or non-manufactured cigarettes in many parts of the world. For example, it has been estimated as many as seven times as many bidi's (a locally produced cigarette type smoke) as manufactured cigarettes are consumed in India. Moreover, this situation is not limited to less developed countries. In Norway, fine-cut tobacco for roll-your-own cigarettes accounts for two thirds of the total cigarette market and total per capita consumption of cigarettes is thus about 1660 annually (Collinshaw and Mulligan, 1984). Information on the production and consumption of these alternative forms of tobacco may be unreliable or not available because their production frequently takes place as a form of cottage industry which is untaxed and unregulated. Also, a portion of this production may disappear as unreported consumption by farmers and rural villagers.

It can be generalized, however, that the production and

Source: https://www.industrydocuments.ucsf.edu/docs/xphl0000

marketing of manufactured cigarettes is the sine qua non of a modern tobacco industry. The consumption of manufactured cigarettes tends to have a high income elasticity and reflect more a "modern" tobacco product. The cigarette is the product most promoted by the large multinational tobacco companies and government tobacco monopolies and it is the product whose deleterious health effects have been most studied and well documented. Much of the discussion in this paper focuses on the cigarette as the prototypical tobacco product: however, the arguments presented and conclusions reached can frequently be generalized to include other forms of tobacco consumption.

Trends in Cigarette Consumption

Despite the rapid growth in and dispersion of information on the deleterious health effects of tobacco consumption generally and cigarette smoking specifically, aggregate world wide cigarette consumption has been increasing, almost doubling in the period since 1960. Concern about this aggregate trend has lead public health authorities to sound the alarm about a pending pandemic of smoking induced illness. As a look at the data in Table 2 confirms, however, such generalizations may miss many interesting and important individual developments.

During the period from 1975-9 through 1984, world wide

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production of cigarettes did increase by over 17% or at a compound growth rate of 2.5% per year. As population during this period was growing at a rate of only 1.8% per year, world wide per capita cigarette consumption grew at a rate of 0.7% per year during the period. A closer look at the data reveals, however, that the extraordinary growth of the cigarette industry in China accounted for this entire increase. For the balance of the world excluding China, aggregate consumption increased by less than 1% per year and per capita consumption fell by .8% per year.

It has become a widely accepted "truism" that while cigarette use may be falling in several developed countries because of health concerns, it is being "exported" to and is growing in less developed countries. As can be seen in Table 2 (and is reported in greater detail in Appendix A), the experience of developing countries is mixed. Several countries, China, Egypt, Malawi and others, report high rates of growth in both aggregate and per capita consumptions. Many other countries, however, report rates of growth in consumption below rates of population growth suggesting that per capita consumption is in fact falling. More attention should be paid to these differences in the rates of growth in different countries to aid in formulating effective smoking control policies for less developed countries.

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HEALTH EFFECTS OF TOBACCO USE

The link between tobacco use, either by smoking or chewing, and ill health is well documented. Most of the evidence concerns life-threatening chronic illnesses in cigarette smokers in developed countries but there is evidence of the dangers of various forms of tobacco use from less developed countries. The three major categories of tobacco induced illness are cardio-vascular disease, cancer and chronic respiratory diseases.

Cardiovascular diseases are the leading cause of death in most developed countries and are beginning to become important health problems in several LDC's including China, Malaysia, Mauritius and Sri Lanka (World Health Organization, 1986). The influence of smoking on cardio-vascular disease is independent of, but also synergistic with other risk factors such as high serum cholesterol levels. The relative risk associated with smoking is greater at young ages and cigarette smoking seems to be particularly important in increasing the risk of sudden death in men under 50 years of age.

Smoking is causally implicated in most respiratory cancers (particularly lung cancer) and chewing tobacco is a major risk factor for oral cancers. Lung cancer is so strongly linked to cigarette smoking that it is generally

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used as a "marker" for smoking induced illness. There is however, a lag of about 20 years between increases in cigarette smoking and increases in lung cancer. In addition, there is a strong correlation between the duration of regular cigarette smoking and the subsequent development of lung cancer (a doubling of the duration of regular smoking leads to a twenty fold increase in lung cancer incidence), (World Health Organization, 1986). The combination of the 20 year lag in the onset of illness and the relationship between duration of smoking and the incidence of disease means that the full impact of smoking on cancer levels may not be realized until decades after an increase in smoking. As a consequence, the full effect of increased levels of smoking on health in those LDC's where smoking has increased recently may not be evident for many years.

Smoking has also been implicated in the development of chronic bronchitis and emphysema and as exacerbating acute respiratory diseases. It is an important factor in cancers at many sites in the body and has been found to be particularly deleterious to reproductive health. Smoking during pregnancy has been shown to result in increased rates of fetal and perinatal death and low birth weight. These adverse pregnancy effects can be serious in many LDC's where infant mortality rates are very high to begin with. These adverse effects are mitigated in those LDC's where smoking is uncommon among women of child-bearing age, but in these

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countries, preventive measures may be necessary to discourage the initiation of smoking by this group.

Recently attention in developed countries has focused on the effects of passive smoking - the effects of tobacco smoke on non-smokers. There is some evidence to suggest that passive smoking may give rise to an increased risk of cancer in non-smokers and may exacerbate certain existing health problems in non-smokers. For these reasons as well as the discomfort passive smoking causes many non-smokers, smoking is increasingly viewed as being less socially acceptable and efforts are being made to separate non-smokers from smokers.

Costs of Smoking

Concern about the health consequences of smoking has raised questions about the economic consequences of these health effects and there have been a number of estimates of the economic costs of smoking (Offices of Technology Assessment, 1985). These studies typically have several components:

1) They attempt to measure the health consequences of smoking by identifying the increased incidence of smoking induced illnesses in smokers and attributing this increased level of disease to smoking.

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2) They apply these attribution ratios to estimates of the costs of caring for individuals with these illnesses in order to obtain an estimate of the direct (health care) costs of smoking.

3) They obtain estimates of the "indirect" costs of smoking induced illness by first obtaining measures of the increased rates of morbidity and mortality in smokers and then valuing the time lost due to morbidity by a measure of the wage rate and the excess mortality by a measure of discounted future earnings.

Over a dozen such cost of smoking induced illness studies have been performed for the United States. In addition, estimates of various aspects of the costs of smoking induced illnesses have been calculated for Canada (Forbes and Thompson, 1983), the United Kingdom (Atkinson, 1974), Sweden (Hjalte, 1984) and Switzerland (Leu and Schaub, 1984). Chabbou, et al., (1984) have examined the costs of smoking induced respiratory illnesses in Tunisia, but comprehensive estimates have not been attempted for other less developed countries. Moreover, there are a number of reasons to believe that the estimates derived for developed countries are of limited value in analyzing the costs of smoking induced illness in most LDC's. These reasons include:

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1) Most cost of illness studies have been based on estimates of the prevalence of illness in a particular year. Because of the chronic nature of many smoking induced illnesses and the lags between the initiation of smoking and the appearance of some important smoking induced illness, prevalence-based cost estimates reflect the consequences of historical trends in smoking. They cannot be used to estimate the impact of smoking control policies nor to predict the impact of increases in smoking except over the very long run. They also cannot be used directly to measure the "excess" costs of smoking borne by non-smokers because of this time factor, and because they are designed to reflect resource costs and not financial transfers, they do not measure directly the pecuniary externalities associated with smoking which are principally the result of financial transfers.

2) The cost estimates are heavily dependent on reasonable estimates of the amount of smoking induced illness in a population. This has both statistical and epidemiological implications. From a purely statistical perspective, these procedures require reasonably reliable and complete information on the prevalence of tobacco induced disease (or cause of mortality) and reasonable information on smoking behavior. Neither of these are likely to be attainable in most LDC's. The World Health Organization

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considers vital statistics from most LDC's to be unreliable and incomplete. In some LDC's, recently reported increases in deaths from lung cancer have coincided with rising rates of death from all cancers leading some to speculate that the changes in cancer death rates reflect increases in reporting as much as increases in the incidence of the disease itself.

More important conceptually, however, is the fact that the competing causes of illness and death in many LDC's are different from those found in most developed countries. Given the current level of knowledge, generalizations about the probable impact of smoking in LDC's, as a group, are fraught with uncertainty. For example, several of the most important smoking induced illnesses identified in developed countries are typically not experienced with frequency until age 50 in males and later in females. Accordingly, in those LDC's, principally in Sub-Saharan Africa, where life expectancy at age 15 still does not exceed 50-55 years, it is unlikely that the toll of these illnesses will be substantial or easily identifiable.

The majority of LDC's, however, have already experienced the epidemiologic transition and have entered the phase of development where life expectancy after childhood has improved substantially because of the control of infectious diseases. In these countries, it may be possible to identify the smoking induced illnesses identified in developed

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countries; however, the relative importance of these illnesses is tempered by the competing role played by illnesses of less importance in developed countries. Differences in disease incidence can even be seen among developed countries with high levels of smoking. For example, cancer death rates in Japan and the U.K. are approximately equal. Yet, 43% of Japanese cancer deaths in 1970 were due to stomach cancer while stomach cancer accounted for only 12% of cancer deaths in the U.K. in the same year. In the U.K., lung cancer accounted for 27% of cancer deaths in 1970 compared to only 9% of deaths in Japan in the same year (Preston, 1972). Per capita cigarette consumption was approximately equal in the two countries (though historically higher in the U.K.); other factors (genetics, diet) may account for these differences. The scant data available from several LDC's suggests that competing causes of mortality may also complicate comparisons for these countries. In Egypt, nearly one-third of malignant neoplasms reported in 1976-77 were sited in the bladder, compared to just over 1% in the lung (Ibrahim, 1982), and in many other countries in Africa and Asia, both liver and stomach cancers are important causes of death. Although tobacco use has been identified as increasing the risk of developing cancers in sites other than in the respiratory tract and oral cavity, the full impact of tobacco use in the presence of different competing sources of illness requires further investigation. Moreover, the need for more

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information in this area extends beyond the diseases traditionally linked to tobacco use as the potential hazards posed by the synergy between tobacco use and the particular background health conditions (malnutrition, tuberculosis, etc.) in many LDC's has not been adequately explored.

The problem of accurately estimating the costs of tobacco use is compounded by the inevitability of sickness and death. Given that man is mortal, smoking should be regarded as an activity that shortens life and accelerates the onset of serious illness. The real costs of smoking are primarily the losses due to this acceleration and not the total cost of death and illness per se. Thus, estimation of the cost of tobacco use is likely to be problematic in many LDC's because in some the acceleration due to smoking induced illness may be small given the high level of competing risks, while in others success in reducing illnesses not related to smoking, may increase the importance of smoking induced illnesses.

3) The cost-of-illness studies performed for the U.S. and other developed countries reflect care rendered in sophisticated and expensive health care systems using high technology medical care. Health care systems in most LDC's are quite primitive in comparison and access to sophisticated therapies extremely limited or nonexistent. Accordingly, both the costs and benefits of health care in these countries

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are likely to be quite different than those found in developed countries. Moreover, it is speculative to use the experience of developed countries to derive predictions of future trends in health care for LDC's because both the future development of medical technology and the rate of its transference to LDC's is largely unknown. The impact of smoking induced illness on health levels may be exacerbated if increases in smoking induced illnesses lead some LDC's to divert health care resources from broad-based primary care programs to the development of costly, high technology facilities.

4) Lastly, it should be recognized that the prevalence based cost of illness approach is itself extremely limited in that it ignores many tangible and intangible costs of illness. Among the tangible cost ignored are travel to obtain health care, time lost from alternative activities by others to care for a sick individual, and modification of life style and the physical environment to accommodate chronic illness. More important are the intangible burdens of illness, pain and suffering, premature death and the deterioration in the quality of life which may be at least as important as the measurable economic costs of illness but which cannot be quantified in monetary terms by this method. These later considerations have lead analysts to consider the "willingness to pay" approach as an alternative method for measuring the cost of illness. Application of this method in

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developed countries has frequently resulted in inconsistent estimates and the prevalence-based human capital cost of illness approach has been used largely by default because of the availability of the data to perform the calculations and the apparent consistency of estimates when the method is applied carefully.

The so-called "incidence" based approach is another procedure that has been used to estimate the cost of smoking induced illness (Oster, et al., (1984a, 1984b)). Following this procedure, the economic costs of smoking are modeled as the average additional costs per smoker that will be incurred over a smoker's lifetime due to specific smoking induced illnesses. Estimates can be made of both the direct (medical care expenditures) and indirect (lost wages, salaries and housekeeping services) economic costs of smoking and of the benefits of quitting. The estimates, as derived by Oster, et al., for lung cancer, coronary heart disease, and emphysema, are the present discounted value of a future stream of expected additional lifetime costs resulting from the excess risk of occurrence at any time in the future of smoking related diseases in persons who smoked in 1980 and continued to smoke in the future. The benefits of quitting are similarly estimated as the difference between the cost of smoking estimate and a similar stream of expected costs for former smokers which reflects the gradual rate of decline in their increased risk for these diseases.

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The incidence based approach is conceptually better suited than the prevalence based methodology for estimating the impact of smoking in LDC's particularly as it relates changes in current smoking behavior to future changes in the costs of smoking induced illness. Unfortunately, the "incidence" based procedure suffers from all of the limitations regarding transferability from developed to less developed countries discussed above and does not directly address the issues of intangible costs or externalities. Moreover, even for the U.S., the incidence procedure suffers from severe limitations of knowledge and data. Although data limitations plague all cost estimates, a recent review by Hodgson and Lewit (1985) highlighted the greater severity of this problem for U.S. incidence based estimates. Accordingly, the situation in LDC's is likely to be worse by several orders of magnitude.

Because the estimation of the costs of smoking-induced costs in LDC's appears highly problematic, I do not attempt in this paper to evaluate different smoking control policies within cost/benefit framework. Rather each policy discussed will be evaluated with regard to its likely effect on smoking per se, its costs and the degree to which it may contribute to a more optimal allocation of resources within the framework of neo-classical welfare economics.

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Fires

Although its deleterious health effects are the principal hazard associated with tobacco consumption, the smoking of tobacco carries with it an increased risk of fire. Kristein (1983) reports U.S. data suggesting that smoking was responsible for from 7.3 to 11% of U.S. fire losses in 1980. The dollar losses associated with these fires (409 to 616 million dollars) amounted to approximately 1% of the estimated total economic costs of smoking for the same year. Atkinson (1974) reports estimates for Britain from the late 1960's which suggest that the cost of fires attributable to smoking represented less than 4% of the total economic costs of smoking. There appears to be little data on the fire costs generated by smokers in LDC's. Because of high population densities in certain urban areas, the use of flammable building materials and low level of fire protection in many less developed countries, the fire hazard posed by smoking might be greater in these countries than the estimates for the U.S. and U.K. would indicate. On the other hand, smokers in LDC's may be more careful than smokers in developed countries because of concern about the fire risk. Because the fire costs of tobacco appear small compared to its health costs, they are not explicitly addressed in this paper. However, much of the general

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discussion regarding the rationale for government intervention and the various demand-directed policies are relevant to the increased risk of fire due to smoking tobacco.

RATIONALE FOR GOVERNMENT INTERVENTION

For many the very fact that tobacco use results in illness and death would be adequate justification for intervention by governments to control the use of tobacco. They would argue that society, via government, has a duty to promote and preserve public health. Valid as this premise may be, it is not an adequate criteria by which to judge or justify various interventions. First, it is not helpful when a choice has to be made between alternative policies intended to increase health in different ways. More importantly, it doesn't help us address the problems that arise when, inevitably, the pursuit of public health comes into conflict with other valued goals such as preserving an individual's right to make choices about his own life.

Economics is concerned with making choices between various beneficial alternatives when not all desirable ends are simultaneously obtainable. Accordingly, the approach of welfare or normative economics may be of value in assessing tobacco control policies. The neo-classical welfare economics paradigm is based on the sovereignty of individual

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consumers and takes consumer decisions as important data in evaluating alternative states of the world. Within this framework, consumers' choices are driven by their efforts to satisfy exogenously determined tastes subject to constraints on their resources (e.g., limited time or income). Given appropriate information about products and prices, each consumer purchases a market basket of goods designed to maximize satisfaction. Consumer purchases of certain goods in certain quantities, as opposed to the other choices available, are said to "reveal" that the actual purchases are preferred to the alternatives. Two conditions of this paradigm are that consumers have full knowledge of the consequences of their choices and that consumers always choose the market basket that provides them with the most satisfaction. If these conditions are met, it is reasonable to infer that individuals who use tobacco prefer this activity to alternative consumption choices and that depriving them of this option will in some sense make them "worse-off".

The notion of revealed preference is not enough to allow us to judge between alternative policies or states. An efficiency or optimality criterion is also required. The generally accepted Pareto optimality criterion states that an optimum is obtained when it is impossible to make any individual better-off without simultaneously reducing another's welfare. This criterion rests implicitly on a desire to avoid making interpersonal comparisons and in so

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doing, it says nothing about the desirability of alternative distributions of satisfaction within society.

Prices are signals that guide resource allocation. They inform producers and consumers about relative costs and trade-offs. Well-functioning, competitive markets are said to be efficient because they allow participants to reach Pareto optimal states. In such situations, the role of government is limited because movement from a Pareto optimum generally will leave some citizens worse off and hence violate the optimality criterion.There may be, however, a role for government intervention when markets fail to reach optimal states. In the case of such market failures or inefficiencies, government intervention is generally thought to be warranted if the market failure is important, and if government intervention can help to correct the failure without doing significant harm. Several sources of market failure have been identified with the use of tobacco and may serve as justifications for government intervention. They include externalities in consumption and production, inadequate information about the dangers of consumption and addiction.

Externalities

Externalities are defined as harmful or beneficial side effects of an activity not borne directly by parties to

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that activity. Externalities may result in inefficiencies because market prices do not take these side effects into account in allocating resources. In the case of tobacco use and particularly smoking, the benefits of the activity stay with the smoker while some of the negative consequences are borne by others. These externalities fall into two groups, financial externalities and passive consumption externalities.

Since tobacco use can lead to premature illness and death, it can result in significant financial externalities. These externalities may arise because in the institutional framework of many societies, the health costs of smoking induced illnesses are borne by non-smokers as well as smokers via health insurance and disability programs. In such situations, smoking not only imposes a financial burden on non-smokers but also is subsidized because smokers do not bear the full costs of their consumption. The existence of such a financial externality presents a very compelling argument for government intervention.

Only the net costs of smoking not borne by smokers result in financial externalities. Moreover, a thorough accounting of all smoking induced externalities is necessary before the net financial externality can be determined. For example, smokers may consume more than their fair share of health care but compensate for this by leaving unclaimed

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pensions behind them when they die prematurely.

In less developed countries, without well established institutional supports for the sick and disabled, financial externalities may be less important than in modern industrial societies. There is, however, a kind of intra-family externality that may be important in both developed and developing countries. In both situations, the premature illness and death of a family member can place an added burden on other family members. This burden is conceptually similar to the burden of excess illness mediated via societal insurance schemes but more difficult to measure.

A nonfinancial externality which results from the deleterious health effects of smoking is the pain and suffering caused some individuals by the illness and death of another. Unfortunately, welfare economics has not been clever enough to deal effectively with situations where the health of some persons are important to the well-being of others. The problem arises because there is no accepted procedure for measuring the strength of feelings or for trading in feelings. As a result, there is no easy way to reconcile one family member's concern about the health or well being of another with the other's desire to engage in dangerous activities.

Recently, concern has focused on the consequences of

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"passive" smoking and in particular on the deleterious effects of smoking on the health of non-smokers. At the very least, tobacco smoking is a nuisance and minor irritation to nonsmokers; at the other extreme, there is evidence that passive smoking may increase non-smokers' risk of developing the same kinds of diseases that plague smokers.

Intra-family externalities may arise because of the effect of consumption of tobacco by certain family members, typically parents, on the health of other family members. For example, smoking or other exposure to tobacco use during pregnancy can impair the health of the fetus with serious residual effects on the subsequent health of the child. In addition, Cohen (1981) has reported that in Bangladesh family resources are used to purchase tobacco by adults (fathers) rather than food. As a result, the nutritional status and ultimately the health of their children may be compromised. Similar situations may arise in other countries. As a general rule, intra-family externalities are difficult to evaluate because given limited resources, consumption by some family members, whether in the form of tobacco or as other goods, must be at the expense of other family members.

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Lack of Risk Awareness

An important condition for optimal decisions by

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consumers is that they be aware of the consequences of their actions. Observation suggests that it is reasonable and rational for individuals to take certain risks, but it is impossible to assert that participation in hazardous behavior is desirable if participants are unaware of the risk involved. As tobacco use is hazardous, we cannot be sure that tobacco consumers are acting in their best interests unless they understand the consequences of their behavior.

It should be noted that while the conceptual notion of an informed consumer making rational choices is an attractive paradigm, assuring this event in the real world is problematic. In particular the acquisition of information about products is costly, and as a result, consumers will economize on the acquisition of information. Moreover, the traditional consumer procedure of acquiring information by sampling is unlikely to yield information about the deleterious effects of tobacco use. Similarly, it is not to be expected that left to their own devices, suppliers of tobacco products will inform consumers of the risks of consumption. They may, in fact, attempt to misinform consumers about the dangers of tobacco use. Accordingly, there is reason to believe that consumers will, in the absence of government intervention, be less than optimally informed about the consequences of tobacco use and that this may be particularly true in LDC's where experience with the consequences of tobacco use may be limited and

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information dissemination difficult. Government intervention to supply the necessary information would appear justified.

Dependency/Addiction

It is frequently alleged that because tobacco use can or frequently does lead to addiction, it is associated with market failure. This "market failure" is said to result from the fact that habitual smokers can no longer make "rational" choices about smoking.

The primary evidence in support of the "irrationality" of tobacco use is the observation that many smokers in developed countries report that they would like to quit but that they can't (Warner, et al., 1986). The experience, however, of millions of smokers following the disclosure of the links between cigarette smoking and disease in the early 1950's suggests that smokers are able to modify their behavior in the light of new information about the dangers of smoking. Moreover, in addition to the millions of smokers who quit smoking completely, most continuing smokers responded to the information on the dangers of smoking by changing the type of cigarette they smoked. The ambivalence of current smokers regarding their behavior appears to result from the difficulty that arises in choosing between two undesirable states - tobacco deprivation and ill health.

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Neoclassical welfare economics begins with the paradigm of fully informed, rational consumers. An extreme case of addiction, polar to that assumption would be the smoker who derives no utility from smoking and smokes only from force of habit. In this extreme case, because the smoker derives no benefit at all from smoking, his welfare would be increased if he could be convinced to spend his money on another commodity. This scenario is analogous to viewing smoking as a disease which is costly and yields no benefits. Accordingly, policies which curtail smoking act as a "vaccination" to eliminate the costs of smoking without any loss of forgone utility (Atkinson, 1974) (1).

The assumption that there are no benefits from smoking is not very realistic and it is likely that attempts to control tobacco use will impose costs on some smokers. The costs of tobacco control policies will differ among smokers and non-smokers and with the level of smoking in society. In general, policies designed to discourage the initiation of smoking will be less burdensome than policies designed to curtail smoking. Policies that place a heavy burden on smokers "for their own good" are likely to be sub-optimal as the observation that some smokers want to quit but can't means that they perceive the costs of quitting to be too high. Ultimately, conflicts may arise as certain policies designed to curtail the initiation of smoking may result in

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significant hardships for persistent smokers.

Children

Although aspects of the general normative model may apply to children as well as adults, most modern societies treat children differently than adults. In particular, a child's prerogative to engage in risky behavior is typically curtailed; parents are frequently held accountable for their children's actions; and parents and other adult authority figures are given more control over children's behavior than they typically have over the behavior of other adults.

This special treatment of children results from their special vulnerability. Not only are they typically physically more vulnerable than adults, but because of their lack of experience and knowledge, they may be less able to make appropriate decisions in many circumstances. To use the paradigm we have relied on thus far, children may not be able to make informed optimal decisions because they lack adequate information and because they are frequently not able to act rationally (they cannot evaluate the consequences of their actions). As a result, government policies which restrict the prerogatives of children for "their own good" may be justified.

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population at large will inexorably have an impact on children both because of their tendency to imitate adult behavior and because of a shift in the general social climate in a direction less supportive of tobacco use.

POLICY INSTRUMENTS TO REDUCE DEMAND

Informational Strategies

A basic requirement for efficiently functioning markets is that consumers be aware of the consequences of their actions. If they are not, then their consumption decisions are not likely to be optimal and will not reflect their true preferences. In the case of tobacco, it is thus important that consumers be aware of the ultimate health effects of consumption.

Because disclosure of information on risks of smoking will most likely reduce demand for tobacco, profit maximizing tobacco merchants cannot be expected to provide complete and appropriate information on the dangers of their product on their own initiative, and government intervention may be required to get the information across. In fact, Leu (1984) argues that many activities which help people avoid the harmful effects of smoking are public goods which will be underproduced in the absence of government intervention (2).

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Many governments take a paternalistic position regarding the use of tobacco by children. The use of tobacco by teenagers is banned in most states in the U.S. (Lewit, 1985) and recently, smoking by teenagers has been publicly discouraged in advertisements of some cigarette producers (Warner, et. al., 1986). Ironically, in the U.S. and other developed countries, the use of tobacco is initiated almost exclusively during the teenage years frequently by individuals who possess a knowledge of the dangers of tobacco use, but who believe that they will be able to give up tobacco before their health deteriorates significantly. These teens may be underestimating the full danger of tobacco use as a result of underestimating the difficulty of quitting when they get older.

Cultural differences and different patterns of cigarette consumption suggest that significant intercountry differences can exist in attitudes toward children and their smoking behavior. Typically, children are more plentiful in LDC's than in developed countries, and they face significant health risks whether they use tobacco or not. Because of high level of competing priorities for children in many poor countries and the long period of time required before intensive smoking control programs directed at children will pay off, the value of smoking control programs directed toward children in these countries is difficult to determine. Suffice it to say that effective smoking control programs directed at the

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INTERNATIONAL EXPERIENCE WITH CIGARETTE ADVERTISING BANS

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Today, some people continue to smoke because they are unaware of the health consequence of smoking. In developed countries, smokers may be aware that cigarettes are dangerous but may be very uncertain as to the actual extent of the risk involved (Warner, et. al., 1986). In less developed countries without health information initiatives, many smokers may be largely ignorant of the existence of any risk. Informational strategies to correct this lack of knowledge are desirable because they are non-coercive and they will help consumers make better decisions. They implicitly recognize the prerogative of informed consumers to make choices about their lives and to engage in risky behaviors if they want. At the same time, they recognize that consumers cannot trust in their own decisions if they are not informed.

Evidence on the effects of the dissemination of information on the hazards of smoking in developed countries suggests that consumers value such information and react to it in making consumption decisions. In the U.S., many studies have been made of the impact of the "anti-smoking" campaign--a series of government and private initiatives that began in the early 1950's with the initial disclosure of the association between cigarette smoking and lung cancer in reports by the American Cancer Society and the British Medical Research Council. This was followed by the U.S. Surgeon General's Report in 1964 and a semi-official

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government policy of informing consumers of the health hazards associated with smoking. Additional pieces of the U.S. information campaign over the last 30 years included the placement of health warnings on cigarette packages and in advertising, the disclosure of the tar and nicotine content of cigarettes, anti-smoking commercials, a ban on broadcast advertising of cigarettes and most recently a series of annual Surgeon General's Reports highlighting the different health effects of smoking. Altogether these interventions have lead to a substantial reduction in the portion of the population that smokes, and to reductions in per capita cigarette consumption. Because these interventions have followed each other rather quickly, it has been almost impossible to identify the separate effects of each policy despite the use of sophisticated time series analysis techniques (Warner, 1983).

Moreover, as Schneider, Klein and Murphy (1981) have demonstrated the reaction on the part of consumers to the 1953 cancer reports was almost instantaneous and was sustained over time. Per capita annual tobacco consumption rose almost steadily in the U.S. from 7.5 lbs. per capita in 1932 to 12.8 lbs. per capita in 1953, its maximum value. Since 1953, it has declined steadily falling to 7.5 lbs. per capita by 1978. Initially, most of the decline resulted from consumers' switching to filter cigarettes made with less tobacco and hence delivering less tar. This trend has

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continued, but in addition, smokers are increasingly giving up cigarettes and fewer non-smokers are taking up the habit.

There is little information on the effects of health information on tobacco use in LDC's, but the reports from many different developed countries echo the U.S. experience. Doll (1981) reported for the U.K. that not only has cigarette consumption declined, but also the shift to lower tar cigarettes has been substantial and has resulted in a decline in lung cancer death rates in males.

Interestingly, there has accumulated evidence from several European countries suggesting that just the discussion of smoking and health policies can have a noticeable effect on smoking. Leu (1986) reports that not only did smoking decline in Switzerland following the health disclosures but it declined even more substantially following a public referendum in 1979 on a complete advertising ban despite the fact that the ban was defeated at the polls. There is evidence from Norway of a similar phenomena. Norway instituted a comprehensive smoking control program in 1975, however, the upward trend in smoking in Norway was reversed in 1970, the year the program was debated and endorsed in the Parliament (Bjaretveit, et al., 1981).

Impressive as the evidence is for information dissemination programs, such approaches have been criticized

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as inadequate principally on the grounds that the reductions in smoking haven't been large enough and that people are still not adequately informed about all the risks of smoking (Marshall, 1977). Agreement with these observations not withstanding, these criticisms appear too harsh as they imply that there are consensus standards by which to judge these policies. If we accept the right of knowledgeable individuals to smoke and recognize that smoking may be addictive for some, we should not be surprised if rates of smoking decline slowly. Similarly, given the costs of acquiring, understanding, processing and storing information, we should not be surprised that the average person, smoker or not, is not fully informed as to all the latest scientific findings regarding smoking and health (Warner, et. al., 1986). In fact, there is reason to believe that individuals would be better able to make informed decisions if they knew a little about the relative risk of many different activities rather than obtaining expert knowledge in a limited area.

Health Warnings

A direct way of conveying information about the dangers of tobacco consumption is by placing health warnings on tobacco packaging and in tobacco advertising. Such a procedure is consistent with other consumer labelling requirements and almost costless.

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Warning labels are required in almost all developed countries (Table 3) and in many developing countries including India, Egypt, Mexico and South Korea. Interestingly, they are required in many Eastern European countries including the U.S.S.R. but not in China. The actual content of the warnings and their size is variable. In Japan, smokers are advised "not to smoke too much". On the other hand, Sweden has the most sophisticated labelling scheme whereby 16 different specific health warnings are rotated at random on cigarette packs. The intent of the 16 warnings system is both to convey more health information to smokers and create interest in the labels because of their variety. The U.S. and other developed countries have recently adopted the revolving label scheme (Lewit, 1985).

Evidence of the specific impact of warnings on smoking behavior is limited because warnings are frequently introduced or strengthened as a part of a larger smoking control program. Accordingly, it is impossible to distinguish the effect of the warnings themselves from other interventions. In addition, the effects of the warnings may be cumulative and gradual, affecting primarily marginal smokers and initiates. Lastly, for warnings to be effective they should impart correct information. An understated warning, as is found in Japan, may actually lead people to underestimate the dangers of smoking.

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Because of their low cost, package warnings are an extremely attractive policy instrument for LDC's. They have several drawbacks however. First, if levels of literacy are low, written warnings may not reach much of the vulnerable population. A similar problem arises if several different languages are used by different population groups. Combining written warnings with graphic warnings would be more effective. Second, warnings cannot be effective if they are not seen by consumers. In LDC's, tobacco is frequently consumed in forms other than manufactured cigarettes or manufactured cigarettes are removed from their packages and sold individually, in both instances limiting the exposure of smokers to health warnings.

RESTRICTIONS ON ADVERTISING

Just as nations differ in their requirements for labelling tobacco products, they also have different policies on cigarette advertising. Several countries have total bans on all forms of advertising but many merely restrict advertising (Table 3). Bans or limitations on broadcast advertising are most common and many countries attempt to monitor the content of advertising and require that health warnings be included in advertisements. LDC's such as Brazil, Egypt, Zimbabwe, Taiwan and Mexico have partial advertising bans while the Eastern European Countries, the U.S.S.R. and China have complete bans.

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At the heart of consideration of the efficacy of an advertising ban is consideration of the effect of advertising on the demand for tobacco products. This question is largely unresolved (Warner, et. al, 1986). Advocates of advertising restrictions point out that, not surprisingly, tobacco advertising presents a very favorable picture of smoking and rarely describes the hazards of smoking. They point out that tobacco advertising reinforces a positive social image for smoking and that it might be particularly effective in enticing children to smoke. Lastly, they point to the enormous advertising budgets of the major tobacco companies in the U.S. and elsewhere as evidence that there must be a payoff some where (Warner, et. al, 1986).

Apologists for advertising point out that its primary function in the market for cigarettes as in the market for other goods is to inform consumers of the choices available so that they can make appropriate purchasing decisions. Advertising is thus seen as a competitive tool used by rival cigarette companies to increase sales of their specific brands. Accordingly, it is argued that to restrict advertising would reduce the welfare of consumers and freeze producers into those competitive positions they have already obtained (Boddewyn, 1985).

Most empirical studies performed in the U.S. or the U.K.

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support the notion that cigarette advertising has little or no marginal effect on aggregate demand. This research, however, cannot be used to assess the aggregate effect of advertising in either of these countries or in developing countries. Cigarette markets in the the U.S. and the U.K. are characterized by competitive rivalry among a limited number of large firms. These firms advertise in order to increase demand for their specific products. From each firm's perspective, it is immaterial as to whether the increase in demand represents new smokers or brand switching by established smokers. Each firm's competitive advertising provokes a response from its rivals, and as a result the level of advertising by all firms may well increase beyond the point at which it influences aggregate demand. In such competitive markets, individual firms may not be able to reduce their advertising for fear that they will lose customers to their rivals although all firms would be better off if they could collude and collectively reduce their advertising expenditures below the level of zero marginal response. Econometric models are designed to measure responses on the margin. That they generally find no effect of cigarette advertising on aggregate demand in established cigarette markets may merely reflect the nature of the markets during the time period for which they have been estimated.

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Critics of the cigarette manufacturers tend to view the

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industry monolithically and as a result tend to overlook the competitive nature of the industry. In the U.S., cigarettes are highly profitable commodities even in the current increasingly anti-smoking environment. It has been estimated that a cigarette brand need only capture 0.4% of the total market to be profitable (Makenzie, 1986a). Accordingly, the development and promotion of specific brands designed to appeal to specific segments of the U.S. smoking market is an important activity for many manufacturers. As indicated in Table 4, very substantial shifts in the market shares of the various U.S. tobacco manufacturers have occurred in the post-World War II period. These shifts reflect the relative ability of the different manufacturers to capitalize on the shifts in consumer preferences over this time period. Such shifts included strong preferences for filtered and lower tar cigarettes and the increase in smoking by women. Interestingly, Liggett and Myers whose market share had declined most dramatically over the period covered in the table recently reclaimed a larger share of the market by introducing lower price generic cigarettes to appeal to price conscious smokers.

The impact of advertising may be different in fledgling markets where even the spread of information on the availability of cigarettes might encourage smoking. The situation should also be different in countries with government tobacco monopolies. In pure monopoly situations

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where there is no competition, the only purpose of advertising would be to increase aggregate demand. Interestingly, advertising is utilized by many national tobacco monopolies in both developed countries and LDC's. For example, the BAT subsidiary in Keneya is the country's fourth largest advertiser even though it is an officially licensed monopoly. In some instances, advertising by government monopolies may be intended to promote domestically produced cigarette brands as substitutes for popular imported cigarettes and thus may serve a competitive purpose.

Several other factors come into consideration in evaluating policies to restrict advertising. Chief among them is the claim by critics of the tobacco industry that advertising discourages full and truthful reporting of the health consequences of smoking because the media become dependent on tobacco advertising for revenue. As a result it is claimed that rather than increasing the amount of information consumers have about tobacco products, advertising may restrict the availability of crucial information (Warner, et al., 1986).

There has been concern expressed about the impact of cigarette advertising on children (Warner, et. al., 1986). In part, this concern arises because children may find it difficult to properly evaluate the information presented in tobacco advertising (Lewis and Lewis, 1974) and in part

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because of the addictive nature of tobacco use. Unlike some other potentially addictive substances, tobacco typically produces a negative reaction (coughing, nausea, a burning sensation) on first time users. For those initiates who go on to become regular smokers, however, this initial negative reaction is replaced by a positive response to tobacco use which sustains continued use. Because the initial contact with tobacco is likely to be unpleasant, other positive reinforcers may be needed to encourage tobacco use. Among young smokers, peer support and pressure are typically identified as encouraging smoking. It is also possible that tobacco advertising by reinforcing the positives aspects of tobacco use may encourage tobacco use by children. This model of teenage smoking, although based on observations in many developed countries seems to have validity in LDC's as well. For example, in a study in Dakar, Senegal, 55% of school children were offered their first cigarette by friends and when asked "why did you start to smoke", 45% responded "to look like an actor or sportsman" (Femi-Pearse, 1983b).

There have, however, been very few empirical studies designed to directly measure the impact of cigarette advertising on smoking by children and teenagers. An exception is the study by Lewit, Coate and Grossman (1981) of the effect on teenagers of the anti-smoking messages broadcast in the U.S. from 1966 to 1969. Although not robust in all specifications, their results suggest that exposure to

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pro-cigarette advertising tended to increase the likelihood of teenage smoking while anti-smoking messages discouraged smoking even in the presence of pro-cigarette advertising. The results suggest that the airing of anti-smoking messages in the U.S. under the Fairness Doctrine reduced teenage smoking by between 2.1 and 2.7 percentage points, while the ban on broadcast advertising, which lead to a substantial reduction in anti-smoking messages, only reduced teenage smoking by 0.6 percentage points. These results suggest that the effect of broadcast cigarette advertising on smoking by teenagers is likely to be small but that the impact of anti-smoking messages may be substantial.

Arguments against restrictions on advertising include the observation that such restrictions constitute a limitation on the right of free speech. This argument loses force in the many countries where free speech is already limited. There is also some evidence to suggest that advertising promotes the consumption of safer cigarettes. In addition, cigarette advertising may subsidize sports and cultural events as well as the media to the benefit of non-smokers as well as smokers (this is a positive externality). Lastly, and of largely unrecognized importance, in competitive markets advertising increases the cost and hence price of cigarettes and may substitute for price competition. As a result, it is conceivable that aggregate smoking could

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increase in some countries in response to an advertising ban because of a competitively induced decline in the retail price of tobacco products.

Effects of Advertising Bans

It has been very difficult to assess the impact of advertising bans or restrictions in developed countries and no comprehensive analysis has been attempted for less developed countries. Many "before and after" ban comparisons fail to adequately control for changes in other variables that affect smoking. Other, more sophisticated analyses, are stymied by the fact that restrictions on advertising frequently come into being as part of more general smoking control programs. As a result it is frequently difficult to evaluate the independent impact of advertising restrictions on smoking behavior.

Studies of the effects of different kinds of advertising restrictions in different countries around the world fail to support the argument that advertising plays an important role in the aggregate demand for cigarettes at least in the short run and suggest that in order to judge the impact of advertising bans much longer time horizons may be necessary. For example, U.S. per capita cigarette consumption rose in the early 1970's following the broadcast advertising

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ban as did smoking participation rates of teenagers and women. Since the late 1970's, however, per capita cigarette consumption has been declining. Some observers point to the reduction in broadcast anti-smoking messages that accompanied the ban on pro-cigarette advertising in the early 1970's as reason for the unexpected increase in smoking following the ad ban, but truthfully, this is an instance where too many variables were changing in too short a period of time to be able to evaluate the independent effects of each.

Hamilton (1975) performed a multivariate cross-national study of the effects of cigarette advertising restrictions in eleven "developed countries. He concluded that through 1973 ad bans had not slowed the growth in cigarette consumption in the countries studied. He suggested that smoking education programs would be a more productive use of health promotion resources than would be investment in lobbying for advertising bans.

Much interest in the smoking and health community has focused on the more recent experience in Norway which introduced a comprehensive smoking control program in July 1975. The program included a ban on all forms of tobacco promotion. Per capita sales of smoking tobacco and manufactured cigarettes declined by over 7% in the 6 year period following the implementation of the program. In addition, smoking participation rates of Norwegian teenagers

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aged 13-15 began to decline from the peak levels they had reached in 1975 following decades of steadily increasing rates of smoking in these age groups. Encouraging as these results may be, because they occurred as a result of a comprehensive smoking control program which included health education in schools and tobacco tax increases, it is impossible to evaluate the independent effect of the advertising ban.

Even less is known about the effect of advertising restrictions in less developed countries. Roemer observed in 1982 that while advertising restrictions were in place in 22 of 31 developed countries, only 5 of 26 LDC's had banned or severely restricted advertising. Evidence from a sample of LDC's suggests that the existence of advertising restrictions per se has had little if any effect on trends in or on the level of cigarette consumption (Table 3). China has one of the highest rates of growth in cigarette consumption per capita (7.8% compounded annually) in the absence of any cigarette advertising. In Taiwan, where broadcast and newspaper advertising of cigarettes is prohibited, but billboards permitted for domestic cigarettes only, per capita consumption is growing at less than half the rate of China. While in Hong Kong, where advertising is only marginally controlled, consumption is falling.

In Africa, the situation is also mixed. In Egypt,

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television advertising of tobacco products is prohibited but per capita consumption grew at a rate of 5.6% annually over the past 7 years. Cigarette consumption is also growing very rapidly from a very low base in Malawi, an important tobacco producer with no restrictions on advertising. On the other hand, per capita cigarette consumption is falling in Senegal where the government has undertaken strong anti-smoking measures including an ad ban. Similarly, in Zimbabwe, another important tobacco producer, cigarette advertising has been severely reduced under a government program and per capita consumption is falling. In Zambia, where advertising is prohibited, per capita consumption has remained unchanged over the past 7 years.

Although they are conceptually easy to formulate, restrictions on cigarette advertising may be difficult to enforce. For example, although the broadcast advertising of cigarettes is banned in both the U.S. and the U.K., tobacco company sponsorship of sporting and cultural events which are televised results in some promotional benefit for the companies. In Italy, tobacco companies continue to advertise despite an advertising ban. They apparently believe the returns from advertising are sufficiently high so as to justify the relatively low fines they incur. In some LDC's, Papua New Guinea (ToVadek and Jamrozik, 1983) and Malaysia (Teoh, 1983) for example, tobacco companies are very important sponsors of sports teams and cultural events.

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Regardless of whether these promotional activities actually increase aggregate smoking levels, they probably foster goodwill for the cigarette companies, and attempts to restrict these promotional activities would probably be unpopular particularly if alternative sponsors could not be found. Moreover, evaluation of attempts to restrict these promotional activities would involve a comparison of the marginal effect of the restrictions on smoking behavior and the welfare loss associated with the reduction in the subsidy to previously sponsored events.

Educational Programs

Both broadbased and targeted health education programs have been advocated as tools to reduce tobacco use and the deleterious health effects it engenders (Marshall, 1977). Much has been written about specific educational programs and efforts have been made to develop effective approaches to control smoking in youth and to get adults to quit. Many projects have been undertaken without adequate planning for their evaluation, however, and among the published evaluations the results have been mixed. Given the bias towards publishing positive results, it is reasonable to assume that many attempts have met with little success (Thompson, 1978). Moreover, many of the most successful programs are based on combating culturally specific incentives to smoke, so that they may not be readily

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transferable to LDC's.

A review of the evidence from two community scale intervention projects directed towards adults may be instructive. Both the Stanford Three Community Study (Farquhar, et. al, 1981) and the Finnish North Kareila Project (Puska, et. al., 1983) were experimental or quasi-experimental projects designed to evaluate the results of community focused interventions on cardio-vascular disease risk factors including smoking.

The Stanford Project involved three small towns in rural Northern California. One community was used as a reference or control. A two year media campaign was undertaken in the other two communities. Radio and TV spots, a weekly newspaper column and health information materials were used to encourage smoking cessation, diet modification and an increase in exercise levels. In addition, in one community 20% of the adult population received "intensive" classroom instruction in smoking cessation. In all three communities, smoking fell during the three year study period. But only in the small, intensively instructed group was the decline substantially greater than in the control community.

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The North Karelia project was an intensive, community-based multiple year risk reduction intervention program in Finland. The project relied not only on a media campaign but

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also on a modification of the local health care system and education of health care providers to orient them toward the risk reduction goals of the project. The outcomes differed for men and women. For men, mean reported daily smoking declined in both North Karelia and the reference community during the 10 year period 1972-82, but the decline of 3.4 smoking occasions per day in North Karelia was substantially greater than the decline of 0.7 occasions per day in the reference area. For women, who smoked much less than men in 1972, smoking increased equally in both areas during the 10 year period (Puska, et. al., 1983). There is little published about the cost of the North Karelia project; however, it is described by the investigators as a low cost intervention in a rural, relatively poor area of Finland with few medical resources so its results may be generalizable to certain LDC's. Enthusiasm for the results of the study are tempered by the increase in smoking by women, and the fact that the project was initiated in response to community concerns about the extremely high level of cardio-vascular disease in North Karelia. Because the project evaluation relied on repeated samples of the population rather than panel data, it was not possible to measure changes in behavior directly.

The Stanford and North Karelia projects demonstrate that it is possible to achieve smoking reduction in large groups of people. What is not clear is the value of more intensive

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interventions in populations where smoking may already be declining. For example, the recently concluded Mr. Fit study in the U.S. was a 7 year, large scale, primary prevention trial designed to measure the impact of intensive intervention on 13,000 35-57 year old males at high risk for coronary heart disease. This was a larger, more expensive, and more carefully targeted study than either the North Karelia or Stanford study. After 72 months, 46% of the smokers in the special intervention group had quit but a surprising 29% of smokers in the control group had also quit. Moreover, the difference in quit rates, 17 percentage points, at 72 months was less than the difference at 12 months (19 percentage points) (Multiple Risk Factor Trial Research Group,1982). This suggests that intensive interventions which go beyond informing the population of the dangers of smoking may be subject to rapidly diminishing returns. As discussed previously, the evidence from the U.S. and other Western countries suggests that the long run effects of informing the population of the dangers of smoking may be substantial. It is difficult to generalize this observation to LDC's, but it does suggest that educational interventions may be valuable even if not comprehensive and that given the likely scarcity of skilled personnel, programs which reach a large part of the vulnerable population at low cost are likely to be more cost effective than more expensive, intensive interventions.

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Conclusions and Recommendations

Information based policies to control tobacco use have many desirable attributes. They are non-coercive and reinforce an individual's prerogative to control his own life. They improve market function. In addition, they can have an important impact on tobacco use and tobacco induced illnesses, particularly in the long run.

Specific Recommendations Are:

1.) Labelling of tobacco products: All tobacco products should be labelled with a health warning. The warnings should be factual, understandable and easily read. As there are so many hazards associated with tobacco use, a system of relatively short rotating warnings would appear to be necessary to convey most of the relevant information.

Warnings should be intelligible to the population. Printed warnings should be large enough to be noticed and easily read. They should be worded to be easily understood. As illiteracy is high in many LDC's, a pictographic warning may be of value. It should appear with the written warning and be appropriate for the population to whom it is directed. If tobacco advertising is allowed, warnings should be incorporated as a significant part of each advertisement.

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2.) Tobacco Advertising Should be Severely Restricted or Banned: Although there is no solid evidence that cigarette advertising increases tobacco use or that advertising bans discourage tobacco use, the intent of advertising, especially in countries where smoking is relatively rare, is to encourage tobacco use. Allowing tobacco advertising may create a social climate more conducive to smoking generally, and because it helps sends mixed messages to the populous about the true dangers of smoking, it may blunt the impact of health education programs.

The recommendation of an advertising ban is subject to an important caveat, however. It relates to the difference between the effects of advertising in a tobacco market controlled by a government monopoly and in a competitive market. In a monopoly market, the primarily effect of advertising, if any, will be to increase consumption and in particular to induce non-smokers to begin the habit. Accordingly, advertising should be banned. In competitive markets, however, advertising may be an important tool of competition. Restricting advertising not only limits a firm's ability to compete and perhaps survive, it also has the effect of lowering the cost of cigarettes. If firms turn from competition via advertising to competition via price or other promotions, the net effect of an advertising ban could be an increase in tobacco use. An alternative to an ad ban would be restrictions on the content and placement of

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tobacco advertising and the requirement that all advertisements contain effective health warnings. Such restrictions on advertising will, of course, make advertising much less attractive to firms and they may voluntarily limit the amount of their advertising. In truly competitive markets, however, firms may continue to advertise in order to capture market share. Such advertising may then become a relatively inexpensive vehicle for public education on the dangers of smoking.

3.) Educational Programs: Every effort should be made to advise the population of the many dangers of tobacco use via the media and other forms of inexpensive information dissemination. There is reason to believe, however, that expensive, targeted tobacco control programs may not be justified in many LDC's. Justification for this observation is found in the evidence from several large community-based studies from developed countries which suggest that marginal effects of targeted intensive interventions may be small in adult populations who already have access to information about the dangers of smoking. In addition, the resources available in most LDC's for intensive interventions are quite limited. Accordingly, given the large number of competing, serious health problems in many LDC's, and the uncertain probability that intensive interventions will substantially increase health levels, intensive interventions may not be justified.

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One exception to this recommendation might concern health education for children. Because children are typically not habitual smokers, educational programs directed toward children may be more effective than programs directed to adults. In communities where children attend school, the cost of educating them about the dangers of tobacco use may be small and as a result, the payoffs from an effective program large.

This recommendation concerning health education for children is subject to two caveats. First, because there is typically a long delay between the onset of smoking and the onset of related disease, the benefits of smoking control programs targeted to children are subject to substantial discounting and may not be cost-effective when compared with other health programs. Second, it is easy to underestimate the costs of developing and implementing effective smoking control education programs. Much time and money has been invested in developing programs which appear to be effective in the U.S. and other developed countries. There is little evidence, however, to suggest that these programs can be easily transferred to LDC's nor that they will prove effective in differ cultural milieus.

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TAXES ON CONSUMPTION

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Almost all countries levy taxes on tobacco, chiefly on manufactured cigarettes. In addition, in many countries the right to manufacture, distribute and import tobacco products is reserved for a government monopoly. In such countries, the excess profits of the monopoly are a form of indirect taxation on tobacco in addition to the taxes nominally levied.

Taxes may be extracted during most stages of tobacco processing. Import tariffs and customs duties are frequently levied on both raw tobacco and on manufactured tobacco products. Even in LDC's most manufactured cigarettes are made from blends of tobaccos. Such blends frequently require the importation of "American type" blonde tobaccos and oriental tobaccos. As a result, an import duty is included in the price of most cigarettes. In addition, imported cigarettes, usually American or European brands, are popular in many countries. Because of high tariffs, these imported cigarettes typically sell at substantial premiums as compared to domestically produced cigarettes even where domestically produced cigarettes are made of imported tobacco as in Egypt. In addition to import duties, many countries levy specific excise taxes on domestically produced tobacco products as well as VAT and general sales taxes.

Tobacco taxes are an important source of revenue in many LDC's accounting in some cases for 5-12% of all tax revenues.

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They are popular primarily because their administrative cost is low relative to the revenues generated. These taxes are relatively easy to collect because during manufacturing most tobacco passes through a limited number of physical locations (cigarette factories and/or ports of entry). Cigarette taxes account for a significant percentage of the retail price of cigarettes in many countries (Table 5). Taxes amount to approximately 75% of the retail price of cigarettes in Canada, the U.K., Brazil and Chile and amount to at least 40% of the retail price of cigarettes in a large number of other countries including Indonesia, Zimbabwe, India, Venezuela, and Columbia.

In several countries the retail price of tobacco products is determined by the revenue demands placed on the tobacco monopoly by the government. For example, until recently retail cigarette prices in Tunisia were set at 125% of the revenue requirement established for the government monopoly. Accordingly, 80% of the monopoly's revenues were allocated to the government and 20% to the costs of running the monopoly. As the monopoly controlled all aspects of the tobacco industry in Tunisia including growing, manufacturing exporting, importing, and wholesale distribution, this 20% was allocated among all of the factors in the industry. In other countries with government tobacco monopolies, the monopolies may determine the margins received by retailers as well as the prices paid to the various factors

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of production. Because these prices are frequently set administratively, it is difficult to judge the net profitability of the government tobacco monopoly or to determine the extent of the subsidies that may be paid to the various factors of production.

In some countries, however, tobacco taxes are low or nonexistent. In the U.S, the federal cigarette excise tax amounts to only 15% of the retail price of cigarettes (the combination of federal, state and local taxes accounts for over one third the retail price). In Malawi, taxes amount to only 25% of the retail price of cigarettes and in Korea, a major tobacco and cigarette producer, there are duties on imported tobacco products but no taxes on domestically produced products. In Togo, taxes amount to only 5 to 8% of the retail price of cigarettes. A somewhat unusual situation exists in Egypt which imports all its tobacco but manufactures most of its own cigarettes. Various import duties and taxes are levied on the imported tobacco but until recently domestically produced cigarettes were sold by the government tobacco monopoly at prices below the cost of production. This resulted in excess demand and queues for cigarettes were common place. Recently, the price has been increased, production increased and the excess demand situation has been eliminated (U.S. Dept. of Agriculture, 1985g).

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Effect of Taxes on Consumption

There are few studies of the effects of taxes on the consumption of cigarettes and other tobacco products in LDC's. Studies from the U.S., the U.K. and Switzerland all suggest that the price elasticity of demand in these countries is in the range of -0.4 to - 0.6 (a 10% price increase will result in a 4 to 6% fall in the quantity demanded). An important implication of a price elasticity less than one is that since price rises more rapidly than quantity falls total revenues and total tax collections increase in response to a tax increase although quantity smoked declines.

A study by Lewit and Coate (1982) suggests that in the U.S. much of the reduction in cigarette demand that would accompany a cigarette tax increase would result from encouraging smokers to quit and discouraging non-smokers from initiating the habit. In a related study, Lewit, Coate and Grossman (1981) demonstrated empirically that teenage cigarette consumption is more responsive to price changes than is the consumption of adults and that young adults are more price responsive than middle-aged adults. This finding is consistent with the notions that as a group teens and young adults are less likely to have become habitual smokers and hence might be more responsive to price fluctuations, and that young people have less disposable income than older

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people and thus are more likely to exhibit greater price elasticities of demand for a wide range of products including tobacco. These results suggest that the price elasticity of demand for cigarettes might be higher than -0.4 to -0.6 in developing countries where incomes are low and established smokers represent a small portion of the population. The recent experience in Brazil where per capita cigarette consumption fell substantially after years of rapid growth in response to large cigarette tax increases and a general economic slow down further supports this notion (U.S. Dept. of Agriculture, 1985e). There is also additional evidence that income levels may play an important role in determining smoking behavior in developing countries. As for example, the rapid increase in smoking in China has been attributed to rapidly rising incomes particularly in rural areas (U.S. Dept. of Agriculture, 1985b) while recent declines in per capita cigarette consumption in Zaire, Peru, and Bolivia have been attributed to falling national incomes in these countries (Chandler, 1986).

In most LDC's, the price elasticity of demand for all tobacco products may be difficult to measure and may be much lower than the price elasticity of cigarettes. This is because in response to a tax increase, smokers may substitute lower-priced tobacco products for heavily taxed cigarettes. In many LDC's, there are a variety of cigarette brands that sell at a wide range of prices, and smokers can respond to a

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tax (price) increase by switching to lower-priced cigarettes. Other, perhaps more marginal, consumers may switch to roll-your-own or home-made cigarette substitutes or even chewing tobacco. In addition, in some countries high levels of taxation encourage smuggling and other forms of tax evasion which may provide lower-priced substitutes for fully priced (fully taxed) cigarettes.

Rationale for a Tax Policy

High taxes on tobacco products are sometimes advocated as a desirable instrument to reduce tobacco use. One rationale for using tobacco taxes to curtail tobacco use is that in the absence of adequate information about the health effects of smoking, individuals may underestimate the true cost of smoking and as a result, smoke too much. A tax which increased the price of cigarettes would send a signal to consumers that smoking is more costly than they had perceived and the resulting reduction in smoking may increase welfare. In particular, as long as the price elasticity of demand is not zero, it is theoretically possible to achieve via tax policy the same amount of reduction in tobacco use that would result from an effective health education program. In practice, it would be difficult to determine, a priori, the effect on demand of an effective health education program and therefore difficult to select the appropriate tax rate

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even if the price elasticity of demand for tobacco were known. Governments, however, may find a tobacco tax policy, which yields revenue, to be more attractive than health education programs which are costly. From a welfare economics perspective, however, the approximate equivalence of tax and information policies depends on the tax revenues being returned in one way or another to the taxed. If not, such a tax imposes a burden on smokers that an information program does not in that their disposable incomes are reduced and their ability to substitute other goods for tobacco curtailed.

Externalities which arise when smoking imposes costs on non-smokers may also justify taxes on tobacco. Externalities may arise because of the excess health and disability costs imposed by smokers on non-smokers via governmental or private social insurance plans. Externalities may also arise because of the deleterious effects on some non-smokers' health that result from passive smoking.

A sumptuary tax designed solely to reduce smoking and its related adverse health effects is sometimes advocated by public health groups. Such an approach is based entirely on ethical or paternalistic considerations and economic efficiency considerations are not implied. For example, a special American Heart Association Subpanel recently advocated an increase in the U.S. cigarette excise tax

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largely because the tax increase was viewed as an effective way to discourage smoking, especially among young people (Warner, et. al., 1986).

Limitations of a Tax Policy

Unlike information based policies, tax-based smoking control policies may not meet the criteria for improving welfare. To the extent that taxes are designed to correct market failures resulting from inadequate information and externalities, they will increase welfare. However, many would reject a sumptuary tax designed solely to reduce the level of smoking and smoking related diseases as being excessively paternalistic. In fact, because product-specific excise taxes cause consumers to modify their consumption behavior, they are generally regarded as "inefficient" fiscal instruments as there may be excess welfare costs to consumers attendant to this behavior modification.

Tobacco based taxes also raise questions of equity. In many developed countries, the cigarette tax is regressive with respect to income, and cigarette tax increases fall more heavily on lower income groups. In less developed countries, the situation is varied and not as easily generalized. In many LDC's, cigarette smoking is positively correlated with income so that the cigarette tax burden may actually be progressive or proportional to income. On the other hand,

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there are frequently a large variety of cigarettes at a wide range of prices in LDC's. The high-priced cigarettes are frequently imports or copies of foreign brands which are heavily taxed. Low-price, low-tax cigarettes are available for those whose budgets are more limited. Thus, across-the-board tax increases may fall more heavily on those least able to afford them. Of particular concern should be the suffering that might be imposed on these smokers and their families who live at the subsistence level. Lastly, regardless of a smoker's ability to pay, a tax-based policy raises the question of the "fairness" of taxing "addicted" smokers as the consequence of such a tax would be to reduce their incomes without any offsetting compensation.

A more subtle limitation of tax-based tobacco control policies are that they encourage the dependency of governments on tobacco products as sources of revenue. This dependency may act to discourage other policies to control smoking as the success of these other interventions would result in a reduction in tax revenue. Ambivalence regarding tobacco control policies may be even greater in countries where tobacco is a government monopoly enterprise. In these cases, the goals of profit maximization and health promotion may conflict. Moreover, that government enterprises were producing and distributing tobacco products might cause consumers to discount information on the deleterious effects of smoking.

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There are other limitations of tax based tobacco control policies. First, high rates of taxation may encourage smuggling and other illegal activity. Different sources report that as much as 25% of all cigarettes consumed in Nigeria (Femi-Pearse, 1983a) and Columbia (U.S. Dept. of Agriculture, 1985b) may be contraband. In addition, international trade statistics indicate that aggregate world wide exports of manufactured cigarettes substantially exceed imports and there is reason to believe that smuggling is the main cause of this disparity (U.S. Dept. of Agriculture, 1985d). Second, high rates of taxation may only encourage a shift in consumption patterns to home-grown and home-manufactured cigarettes, roll-your-own cigarettes, chewing tobacco and other psychogenic substances. When these substitutes are as harmful as cigarettes, this shift may negate any beneficial health effects that might result from the tax-induced reduction in the consumption of manufactured tobacco products. Third, the use of high tariffs on imported cigarettes or tobacco may encourage and subsidize the development of a domestic tobacco industry.

Conclusions and Recommendations

There is a role for tax policy in the control of tobacco use but determining the appropriate level of taxation is

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difficult. For example, a primary justification for a tax-based policy is that a portion of the cost of the excess illness, morbidity and mortality caused by tobacco use is borne by non-smokers. The magnitude of this burden in any country is determined primarily by the institutional framework of that country. Put simply, the key variables are the amount of excess tobacco related costs borne by non-smokers and the rate of taxation on tobacco . In reviewing the situation in Ontario in 1978, Stoddert, et al.(1986) found that, even with a government health care system and high tech medical care, health care expenditures attributable to smoking amounted to at most 30% of the tax revenue on tobacco products. They concluded that no uncompensated externality existed in Ontario in 1978. Similarly, Leu and Schaub (1984) reviewed the situation for Switzerland in 1976 and concluded that "the external costs of smoking are considerably smaller than is often believed because roughly 75% of smoking-related costs are private costs to the smoker".

Estimates of the external costs of smoking in Ontario, Canada, Switzerland and the United States are presented in Table 6. There are several factors which account for the differences in these estimates including differences in estimation techniques, disease incidence, smoking patterns, medical practice and social insurance arrangements. The level of medical care expenditure, column 3, probably

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accounts for some of the variation in the reported estimates. Differences in the level of health care expenditure between the U.S. and Canada would account for 8 of the 10 cent difference in external costs per pack between the U.S. estimate and the high estimate for Ontario. This factor does not, however, explain the differences between the estimates for Switzerland and either the U.S. or Ontario. Because per capita medical care expenditures in LDC's are typically substantially below the levels reported in the table, it is reasonable to believe that the costs of smoking induced illnesses will also be lower in these countries as will be the level of uncompensated financial externalities.

Uncompensated externalities may also be small in many LDC's because: 1) in the absence of well organized institutional support systems, the excess costs of smoking are not likely to be shifted from smokers and their families to non-smokers and 2) the total cost of tobacco induced illness may be low where life expectancy is short or where smoking is a recently introduced activity, or if health care technology is crude and there are many competing sources of disease and mortality.

Tunisia provides an example of the situation in an LDC where tobacco use became popular following World War II and where there is evidence of increasing levels of lung cancer and chronic bronchitis. It has been estimated that the care

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of Tunisians with lung cancer and chronic bronchitis cost the government sponsored health care system 432,000 Dinars in 1982. Net government revenues from the Tunisian tobacco monopoly amounted to 75 million Dinars in the same year. These cost of illness estimates do not include all tobacco induced illness, but even if they were understated by a factor of two or three, revenues would still be more than fifty times expenses (Chabbou, et. al., 1984).

Tunisian health officials, concerned about a rising trend in the level of smoking related disease in their country, have argued that "if the proportion of consumers increases the profit/expense differential will tend toward zero" (Chabbou, et. al., 1984). It is not obvious, however, that an excess burden will ever develop in Tunisia because of the growth in smoking related diseases. The excess health care costs generated by smoking are a function of the number of smokers, the excess prevalence of illness among smokers and the costs of treating the excess illnesses. The net excess burden, however, depends in addition on the rate of tobacco taxation. With a sufficiently high level of taxation, such as is found in Tunisia, an excess burden may never develop. In addition, the crucial time dimension which the Tunisian authors ignored may be important in a number of LDC's. Tax revenues from smokers will frequently be received over a period of time before the adverse impact of smoking on the health care budget becomes significant. Accordingly,

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with appropriate discounting, it is even less likely that a large aggregate excess burden will develop.

The essence of the financial externality argument for tobacco taxes is that tobacco related illnesses may impose an uncompensated burden on non-smokers regardless of their income class. In many LDC's, however, smoking is positively correlated with income which implies that smoking induced illness is more likely to be experienced by those higher up in the income distribution. Hence, increases in smoking induced illnesses may result in a shift in health care resources to provide expensive hospital-based care for relatively well-off smokers. If this shift in resources occurs at the expense of health programs directed at the poor, it may have an undesirable effect on the health of the poor and on the aggregate income distribution. Accordingly, it might be argued that high tobacco taxes are justified in these circumstances as a means of addressing this particular inequity whether the taxes per se discouraged smoking or were used to finance the excess health care consumed by smokers.

Another justification for a tobacco tax is that it can be used to indicate to consumers the "real" costs of tobacco use in the absence of complete information on the dangers of tobacco. It is difficult, however, to know what tax rate might serve as an adequate signal. Warner (1983) presents evidence to suggest that actual U.S. cigarette consumption in

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1980 was approximately 40% less than predicted consumption because of anti-smoking publicity. The estimated price elasticity of demand for cigarettes in the U.S. is about -0.4. This suggests that a 100% price increase in 1980 would have achieved the same level of reduction in cigarette consumption as the anti-smoking campaign. In 1980, cigarettes in the U.S. sold for approximately 63 cents per pack with taxes of 21 cents (or 33% of the retail price). It would appear that taxes of 84 cents per pack (a 300% increase) and a retail price of $1.26 would have been necessary to achieve the actual 1980 level of cigarette consumption in the absence of the anti-smoking campaign. This level of taxation would appear to greatly exceed the level that could be justified by the level of uncompensated externalities in the U.S. in 1980. Thus, if taxes were to be used to indicate to smokers the true dangers of smoking, welfare considerations would require that a method be established to return the excess revenues to those who continued to smoke.

Great care needs to be taken in generalizing from the U.S. example to the situation in an LDC. For one thing, to the extent that the price elasticity of demand for cigarettes is higher in LDC's than in the U.S., a lower tax would be required to have the same impact on demand and to the extent that a tax effectively discouraged smoking, there would be little need to be concerned about the welfare implications of

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not returning the taxes collected to smokers.

The level of taxation on tobacco products is politically determined and in most instances, reflects revenue considerations rather than an effort to redress the inefficiencies and inequities that may result from tobacco use. There appears to be little economic justification for tobacco taxes that exceed U.S. $ .40 per pack of 20 cigarettes or 40% of the retail price of tobacco products. Increases in tobacco taxes may be appropriate, although unpopular, in countries where taxes are very low or where, as in Egypt, cigarettes may actually be subsidized. High taxes may also be useful in countries where few people use tobacco as a device to discourage the initiation of tobacco use.

LIMITATIONS ON SALES AND CONSUMPTION

There are a number of regulatory policies that governments may undertake to reduce the demand for tobacco products. These include restrictions on sales to and consumption by minors, restrictions on merchandising, and restrictions on smoking in public places. Theoretically, the implementation and enforcement of any of these regulations should reduce tobacco use. In practice, evidence of the impact of these policies on tobacco consumption is limited and the costs of effectively enforcing these policies may be

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high. Accordingly, it is difficult to evaluate the cost effectiveness of such policies in developed countries and the situation for LDC's is certainly no better.

As a group these policies are not primarily intended to reduce smoking per se, but to protect certain non-smoking segments of the population from the harmful effects of smoking. Restrictions on sales to minors result from efforts to control the behavior of the young "for their own good". Such restrictions may be justified because of the harmful and addictive nature of tobacco products and WHO has suggested that sales to minors below the ages of 18 or 16 be prohibited (World Health Organization, 1986). Evidence from the U.S., where smoking by children and teenagers is prohibited in many states, suggests that enforcement of such laws is often lax (Lewit, 1986). Little is known about their efficacy in LDC's. Outlawing vending machines, licensing vendors and restricting "broken pack" sales of cigarettes are basically tools for enforcing restrictions on sales to minors. Such restrictions on merchandising practices impose a burden on adult smokers and on tobacco merchants which warrant consideration in evaluating the net benefits of these policies.

Restrictions on smoking in public places result from a concern with the health and other undesirable effects of "passive smoking" on nonsmokers. Bans may extend to

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restaurants, theatres, public transportation and even the work place. Such bans have been adopted in many states and localities in the U.S. and in many other countries, including several LDC's. It is felt that such bans may actually reduce smoking by reducing the number of opportunities smokers have to indulge. In addition, by separating smokers from non-smokers such restrictions may eliminate an important stimulant that encourages the initiation of smoking by non-smokers and recidivism by former smokers. In Finland, this policy has been carried furthest in that smoking in public is universally prohibited except where it is specifically allowed (Roemer, 1983). Again, such policies impose burdens on smokers. They are rationalized largely by the political power of anti-smoking groups. No studies of the costs of enforcement, gains to non-smokers or costs to smokers have been undertaken (Gelband, et al.,1986).

Conclusions and Recommendations

On the surface, government limitations on the sales and consumption of tobacco products appear attractive because their purpose is to protect non-smokers from the dangers of smoking. It is further claimed that they may change the social environment that supports the use of tobacco products and hence hasten the decline in their use (Roemer, 1983). Whether such regulations can, in fact, lead to changes in behavior or whether they merely codify changes in behavior

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and attitudes that have already occurred is an open question. Critics of restrictions on smoking claim they are coercive and would be expensive to enforce (U.S. News, 1986). In the U.S., few resources have been expended in enforcing these laws (Martin, 1986), but this may merely indicate that enforcement is lax or frequently unnecessary. Evidence from the U.S. also indicates that enforcement of restrictions on sales to or smoking by minors is very lax and accordingly, these restrictions appear ineffective. This is in contrast to the evidence from the U.S. on the impact of minimum drinking ages which do appear to reduce but not eliminate the consumption of alcoholic beverages by minors (Coate and Grossman, 1985).

Legislation protecting the rights of non-smokers and protecting minors are two of many tobacco or health recommendations made by the WHO Executive Board in January 1986. Certainly, enactment of such legislation is relatively inexpensive. Effective enforcement of these restrictions may, however, be relatively expensive in many developing countries where resources for this purpose are scarce. It is sometimes claimed that enactment of laws that are not enforced leads to contempt for the legal process and an increase in criminal behavior, although this observation appears unproven. It is unlikely, however, that such an undesirable turn of events would result from failure to enforce restrictions on smoking. Accordingly, it appears

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that legislation restricting sales of tobacco products to minors are warranted and that clean indoor air laws may also be warranted if adequate provisions are made for smokers.

PRODUCTION ORIENTED POLICIES

Tobacco is harmful when chewed or smoked. There are few, however, harmful effects associated with the production of tobacco or of tobacco products, yet concern about the harmful effects of tobacco use have lead some to criticize policies which encourage the production of tobacco. This concern is based on the observation that tobacco could not be consumed if it were not produced. Although true, this tautology by itself is not sufficient to guide tobacco production policies for several reasons.

First, the elimination of the legal cultivation of tobacco in a specific country will not by itself lead to a reduction in the demand of consumers for tobacco products. Restrictions on the supply of tobacco in areas where its use is established will result in an increase in illegal cultivation of tobacco and in trade in smuggled tobacco products. It has been observed that tobacco production and consumption in developing countries may be understated by as much as 20% because of the numerous small scale, on the farm, operations which escape official recording (Economist

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Intelligence Unit, 1983). These operations can be expanded to meet demands created by supply restrictions. In addition, international cigarette smuggling is already a problem in a number of LDC's and might expand to meet unfulfilled demand if supply were restricted. (4). Moreover, the limited success of drug control programs directed at cocaine, marijuana and herion in a number of developed countries suggests that it is easier to legislate than enforce controls on the use of psychogenic substances. At best, controls on supply will raise the "real" price of obtaining tobacco products and as a consequence reduce consumption. Thus, the effects on consumption of direct controls on the supply of tobacco products should be similar to the effects of a high tax on tobacco products. Like a high tax on tobacco products, policies which restrict supply will also impose significant burdens on consumers of tobacco products.

Second, the observation implies that tobacco consumption in a specific area is dependent on tobacco production in that area. However, since tobacco is traded both internationally (about 25% of world production is exported) and domestically, there need not be a geographic relationship between production and consumption. Evidence of divergence between production and consumption can be found in many countries. Egypt is an example of a less developed country where the consumption of cigarettes is high and rapidly growing

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although no tobacco is grown in Egypt. On the other hand, Zimbabwe is an important producer and exported of tobacco where domestic consumption is low and apparently not increasing. In general, the relationship between the production of tobacco and its consumption is a complex one molded by forces, political and economic, domestic and international which impinge on supply and demand.

In addition to health concerns, other factors may enter into the consideration of tobacco production policies. First, that tobacco is produced at all is generally accepted as prima facie evidence of its profitability and contribution to the producers' income. This is the other side of the previously discussed revealed preference arguments economists invoke in evaluating consumer's decisions. Simply put, profit maximizing producers, typically small farmers, will employ factors to produce crops that maximize their net income. Accordingly, when we observe tobacco production we may assess this activity as reflecting optimization. As in the case of the consumer, this argument requires that the producer have all the information necessary to make an informed decision. If he does not, we cannot be sure that he has not ignored alternative more profitable ways to deploy his productive assets. A related and no less important assumption behind this argument is that he wishes to maximize profits. If other criteria enter his decision framework (eg, generating employment for family members), it will be more

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difficult to evaluate the observed consequences of his production decisions.

In addition, it is appropriate to ask whether there is a divergence between the private optima sought by tobacco producers and social costs and benefits. For example, the imposition of a tariff on imported tobacco or tobacco products may increase the prices and incomes received by domestic tobacco producers and may induce them to divert resources from the production of other goods to the production of tobacco. Although this may be an optimal redeployment of resources from the perspective of the producers, it may not be socially optimal as the higher tobacco prices are ultimately paid by domestic consumers of tobacco products. As a result, where tariffs and subsidies exist, it may be difficult to determine the extent to wwhich the observed level of tobacco production is socially desirable or should be encouraged.

Externalities associated with the production of tobacco may also lead to a divergence between what is best for the producer and for the society as a whole. The production of tobacco has been associated in certain countries with costs such as deforestation or environmental contamination that are not borne directly by the tobacco growers. In addition, it is alleged that in poor countries with significant malnutrition problems tobacco production may displace food

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production and exacerbate malnutrition (UNFAO, 1985). In less developed countries the production of tobacco may also be associated with positive externalities including principally the development, introduction and dissemination of modern agricultural techniques. In addition, the cultivation of tobacco may lead to increased investment by multinational companies in LDC's with a resulting increase in incomes generally.

The Current Situation

Today tobacco is grown in over 120 countries. It is the most widely grown non-food crop. Tobacco is grown in most developing countries and the share of tobacco production accounted for by developing countries increased to 63% of world production in 1978-81 from 58% in 1972-74 and only 50% in 1961-63. Most tobacco is consumed within the country of production with only 25% of world production being traded internationally. Tobacco is traded internationally primarily as a "raw" commodity with only certain developed countries (the U.S., U.K., and the Netherlands) being important sources of exported cigarettes.

In many LDC's, tobacco production is concentrated on very small farms in limited geographic areas. Although tobacco is frequently grown in rotation with other crops, because of the value of the typical tobacco crop, tobacco is

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frequently an important source of income not only for the growers but also for their families and local agricultural workers. As compared with most other crops, tobacco uses little arable land but is labor intensive. Its ability to create rural employment is valued in areas where labor is plentiful and productive alternatives scarce. In several countries, literally millions of individuals are involved in or dependent on some stage of the tobacco production process for an important portion of their livelihood. In addition, as tobacco production is frequently geographically concentrated, the dependence of certain geographic regions on tobacco may be substantial.

Observers of the tobacco growing sector in many LDC's have noted that there are many features of the market for tobacco that make tobacco particularly attractive to growers. First, and most important, is the fact that tobacco, where grown extensively, yields higher net incomes per unit of land than most other cash crops and substantially more than most food crops. In addition, unlike other cash crops, the price of tobacco does not fluctuate substantially. Moreover, in most countries, growers negotiate sales prices for their crops in advance of planting so they are protected from the unexpected price fluctuations that plague other crops and they are paid in cash immediately upon sale of the crop (Economist Intelligence Unit, 1983). The combination of pre-negotiated price and quick sale makes it relatively easy to

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finance tobacco growing. The extremely favorable conditions of sale offered tobacco farmers are not usually offered growers of other crops. As a result, much of the risk of tobacco growing is shifted from the farmer to the purchaser.

It is difficult to evaluate the production side of the tobacco sector in many LDC's because of the heavy involvement of governments and large multinational tobacco companies in the tobacco market. Government and multinational company activities include controls on planting, production quotas (guaranteed prices, incentives and subsidies), export and import duties, internal taxes on sales, state tobacco monopolies, state trading in tobacco, foreign aid programs and limitations on marketing. The mix of activities varies by and among producing countries and makes it difficult to generalize about their tobacco sectors. In the discussion that follows, I touch on the likely effects of most of these policies without dealing with the specific situation in individual countries. My purpose is to indicate the effects these policies have on tobacco production and consumption and to examine their implications for policy formulation.

Tobacco and the Price of Cigarettes

Although, by definition, tobacco is a necessary ingredient in the production of tobacco products, the cost of

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tobacco is frequently not an important factor in the price of tobacco products. This particularly true in the case of manufactured cigarettes, the mostly widely consumed tobacco product and the product which typifies the modern tobacco sector which is developing in many LDC's. Although there is little published information regarding the components of the cost of tobacco products in most LDC's, the data from Brazil, the U.S., Denmark, and Italy presented in Table 7 are illustrative of the situation in many countries.

Of note in the table, is the relatively insignificant role the cost of tobacco plays in the price of cigarettes in these countries. Price is largely a function of the very high levels of taxation on cigarettes. Data from the U.S. are most detailed and suggest that even with excise taxes on cigarettes at 41%, the gross returns to tobacco producers in 1972 only accounted for 6% of the retail price of cigarettes. Data from the other three countries, one (Denmark) a nonproducing tobacco importer the other two important producers suggest that at higher levels of taxation the component of cigarette cost accounted for by tobacco would be even less. For example, were the tax on cigarettes in the U.S. to increase to 75% of the retail price and the other cost components remain the same, tobacco costs would account for only 2.5% of the cost of cigarettes in the U.S. This suggests that in most countries where taxes on cigarettes and other tobaccos products are substantial, and this

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includes many LDC's, the price of tobacco and the relative availability of raw tobacco many not be an important factor in the demand for cigarettes by consumers. Given the relatively low price elasticity of demand observed in many countries, cigarette producers should be able to pass on increases in tobacco prices without jeopardizing sales or profits (5).

It is interesting to note that while the price of tobacco may not be an important factor in determining cigarette sales or smoking levels, it is very important to tobacco producers for the price of tobacco determines the net returns from tobacco production. The price of tobacco may also be important to cigarette manufacturers in competitive markets, in markets where the price elasticity of demand is high, or in markets where taxes are low. Producers that enjoy monopoly status, however, may be insulated from concerns about the price of tobacco.

The monopoly or quasi-monopoly status of many cigarette producers, and the low price elasticity of demand for cigarettes account for much of the willingness of cigarette producers to insulate tobacco growers from the risks of tobacco price fluctuations. This risk shifting makes tobacco production more desirable for the growers and probably helps to dampen any price fluctuations that might otherwise arise in international tobacco markets.

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Subsidy of Tobacco Production

There are a variety of mechanisms which subsidize the production of tobacco. In some countries, subsidies arise from a deliberate attempt to develop a domestic tobacco industry. In other situations, they arise because of attempts to control the importation of cigarettes or tobacco from abroad in order to conserve foreign exchange. In addition, most tobacco producers benefit to some extent from U.S. policies which restrict the supply and inflate the price of tobacco.

In many countries, the growing and curing of tobacco is controlled and directed by the major tobacco purchasers--either large private companies as in Brazil or government monopolies as in Tunisia or Thailand. In many situations, these organizations set the price of tobacco prior to planting and provide seeds or seedlings to tobacco farmers who are thus guaranteed a minimum income for their crop at harvest time. The purpose of these production controls appears to be to encourage the production of a limited target quantity of high quality, marketable tobacco (6).

The situation in Southern Brazil is exemplary of an industry sponsored program of support for the tobacco growers. The cigarette manufacturers provide the growers

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with all purchasable inputs including seed, pesticides and fertilizers at wholesale prices and run agricultural extension programs to develop appropriate plants and technology for the area. Farmers are visited regularly by technical advisors provided by the major tobacco companies. The purchasers also play an active role in controlling the chemicals used in growing tobacco so that the crop will conform to U.S. and European standards and be exportable (about 37% of the Brazilian crop is exported). It has been estimated that the value of the extension services rendered farmers by the tobacco companies is equal to 30-35% of the prices paid farmers for the tobacco (Economist Intelligence Unit, 1983).

The Brazilian case is one of several instances where private companies have actively fostered the development of a tobacco growing sector. Many other countries, LDC's and developed, seem to follow a policy of encouraging tobacco production by establishing or supporting high tobacco prices and then institute production controls to avoid excess supplies. Among the developing countries that have recently imposed controls on tobacco production to prevent excess supply are Malawi, India, South Korea, Tunisia, Thailand and the Philippines (United States Department of Agriculture, 1985b). In addition, both the U.S. and Canada control tobacco growing to maintain high prices and the European

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Common Market pays subsidies to its tobacco farmers which exceed the value of the tobacco actually produced.

The existence of subsidies in the market for tobacco may introduce distortions into that market. In particular, subsidies will make tobacco growing more profitable to the farmer than it would be if prices were determined by market forces. This will encourage a shift of resources from other crops to tobacco. In competitive markets, this resource shift would lead to an expansion in supply and an equilibrating fall in price. Where supply is controlled and unable to expand, price will not fall and as a result farmers who have access to the market will earn excess profits called "economic rents". These excess profits will encourage the producers to organize politically to protect their rents against falling prices, increases in supply and government campaigns designed to discourage smoking. Such "rent seeking" behavior has been observed in markets for many products around the world (Johnson, 1984) and should be considered to be a likely result of most regulatory and subsidy policies.

In order to conserve on foreign exchange, many LDC's attempt to discourage the importation of foreign tobacco (either in its raw form or as cigarettes). This is particularly apparent in LDC's with domestic tobacco industries. Thus, Thailand a major tobacco producer, has

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gradually reduced the proportion of imported tobacco in its domestically produced cigarettes to 28% in 1984 from 51% in 1972. Imports are discouraged by restricting the availability of foreign exchange for tobacco imports and by differential taxation which results in substantial (100% or more) retail price differentials between domestically produced cigarettes which contain foreign tobacco and those that do not (U.S. Department of Agriculture, 1985f). Similarly, Tunisia, also a tobacco producer, needs to import tobacco to produce an acceptable cigarette, but imposes a high import duty (171% in 1985) on imported tobacco (U.S. Department of Agriculture, 1985h). As a consequence of such import restrictions, prices received by tobacco growers in these countries are likely to be higher than they would otherwise be, domestic production is stimulated and tobacco farmers' incomes increased. (Interestingly, however, as such measures lead to an increase in cigarette prices and a decrease in average cigarette quality, consumption may be reduced or at least restrained in these countries.)

The U.S. tobacco price support program is an important factor in the development of tobacco growing sectors in many LDC's. The United States is currently the world's second largest tobacco producer, second only to China, and the largest exporter of tobacco. U.S. exports of tobacco accounted for 18% of all unmanufactured tobacco traded internationally in 1981, down substantially from the 35% of

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the market held by the U.S. in 1955-1959. Since 1933, the U.S. Department of Agriculture has operated a tobacco price support program designed to increase the returns to tobacco cultivation. Although the exact form of the program has changed over the years, it basically functions to reduce U.S. production and raise the price of tobacco produced in the U.S. for both domestic and foreign consumption. The program also places restrictions on the size and location of tobacco farms in the U.S. which has made U.S. tobacco production more costly than it might otherwise be.

The higher than free market prices received by U.S. tobacco growers as a result of the U.S. tobacco program benefit the growers and entitlement holders at the expense of consumers both domestically and abroad. These high prices also create opportunities for foreign producers to profitably produce tobacco for both domestic consumption and export (sometimes to the U.S.). U.S. tobacco is generally regarded as being of the highest quality. Accordingly, a substantial fall in its price would make it even more competitive in the world market. Sumner and Alston (1984) have estimated that elimination of the U.S. tobacco support program would very conservatively result in a 25% reduction in the price of U.S. tobacco and a 50% increase in U.S. tobacco production. Very little of this increased production would be absorbed in the U.S. or abroad via increased consumption of cigarettes. Some (27%) would substitute for tobacco currently imported by the

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U.S. but the bulk (73%) would be exported. In either case, the increased production would be highly competitive with tobacco produced in other nations and as a result, tobacco growing would become much less profitable in other nations. In fact, the increase in U.S. tobacco exported and substituted for imports would, because it would amount to over a third of the current export market, be devastating for those developing countries that currently depend on tobacco export earnings for foreign exchange (7).

The various subsidies provided many tobacco producers make the evaluation of tobacco production policies complex and suggest that each case needs to be examined individually to determine the true "benefits" of tobacco production. The vulnerability of tobacco exports and prices to change in U.S. farm policy is difficult to value explicitly but suggests that tobacco development projects should be evaluated with an eye toward changes in this policy. In addition, it should be recognized that in many countries tobacco production may appear desirable primarily because it allows participation in a subsidized market established by the U.S.D.A because the subsidization of U.S. producers at the expense of consumers has created a similar opportunity for other tobacco producing countries. In addition, domestic programs within LDC's which limit tobacco imports also benefit domestic producers at the expense of consumers. Accordingly, they may not confer a "net" benefit on the country as a whole.

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Externalities in Production

Just as various subsidies to the production of tobacco, may cause policy makers and farmers to misvalue the crop, the various externalities associated with the production of tobacco warrant consideration in formulating tobacco related policies. Externalities associated with the production of tobacco reflect costs (negative) or benefits (positive) which are not directly borne by the tobacco producer and therefore are not fully reflected in prices and production decisions. Several important externalities which have been identified with tobacco cultivation in LDC's are discussed below. They are, however, not important in most countries, and thus individual countries require individual consideration.

A positive externality that has been associated with tobacco production is an improvement in farming practices that not only increases tobacco yields but also increases the production of other crops. As noted above, tobacco growing requires a high degree of quality control to produce a tradeable crop and in many LDC's the major tobacco purchasers play an important role in providing the technical support and inputs necessary for a quality crop. In many countries, tobacco farmers grow other crops as well and many of the modern tobacco farming procedures may be applied to their

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other crops. Although this kind of spill-over benefit can only be measured on the spot, there are several studies to suggest it may be important. For example, Sofranko, et al. (1976) studied tobacco farmers in Ghana and India. They found that in both countries farmers who grew tobacco were more likely to use improved, modern technology in producing their non-tobacco crops than similar farmers who did not grow tobacco. Femi-Pearse (1983a) reported that the Nigerian Tobacco Company established a program in 1978 to encourage the cultivation of a high yielding cassava in rotation with tobacco. The new cassava matures in less time than the plant previously grown and produces almost five times the crop yield per acre planted when compared to the traditional plant. In addition, it has been hypothesized that the fertilizers typically used to grow tobacco may enhance the production of other crops grown in rotation on the same plot of land with tobacco. This effect has been difficult to measure empirically although there are many technical reasons for believing that this benefit exists (Economist Intelligence Unit, 1983).

Tobacco requires a "sterile" field for its successful propagation. Accordingly, large quantities of pesticides are used on tobacco crops. Most of these pesticides are toxic and some can contaminate village water supplies. Pesticides, such as aldrin, which are restricted in many developed countries are used in some developing countries to grow

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tobacco. They pose a hazard to those involved in tobacco production, to the environment and to those who consume the tobacco produced.

The contamination of communal water supplies by these pesticides is an externality which should be figured into the evaluation of the benefits of tobacco production and the danger posed by exposure to these chemicals by production workers is an additional cost of production. As is true with so many of the issues surrounding tobacco consumption and production, the extent of the knowledge of those at risk because of exposure to these chemicals is of critical consideration in evaluating the hazard. Individuals should be informed of the risks involved and offered reasonable alternatives to the use of these chemicals. Contamination of local water supplies should be addressed locally by tax or regulatory action. Ultimately, the question of whether these hazards justify curtailing tobacco production depends not on the presence of the hazards per se but on the costs involved in modifying them and the willingness of individuals to accept the risks or bear the costs of risk-reducing activities.

Tobacco cultivation has been criticized on the grounds that it competes for resources with food production in areas where food production is inadequate for the needs of the population. Concern about the problem of malnutrition in

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many third world countries not withstanding, it should be observed that tobacco is not generally an important contributor to this problem for several reasons. First, on the production side, tobacco requires very little arable land and in some countries, tobacco is grown on land unsuitable for other crops. In addition, land used to grow tobacco is frequently used to grow other crops during part of the year as it is typically planted in tobacco for less than six months. As compared with other crops grown in LDC's, tobacco is very labor intensive and creates needed employment in many areas. Tobacco's demand for labor is highly seasonal and in some areas it may compete with the labor needs of other crops but more often because of differences in crop growing calendars it complements the production of other crops (Economist Intelligence Unit, 1983).

The nature of the potential technical complementarily or substitutability of tobacco for food crops is not be the only factor which determines the impact of tobacco growing on food supplies. Of equal importance are the incentives farmers face regarding alternative crops. There is basically no economic reason for a nation or a geographic region to be self-sufficient in food production. In fact, the theory of comparative advantage would suggest that it may be more advantageous to specialize in the production of high profit cash crops and use the profits to purchase food. Distortions may arise however because subsidy programs alter the

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297

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incentives farmers face in making production decisions. For example, governments in many developing countries attempt to restrain food prices in order to favor urban consumers. This may create strong disincentives for growers of food crops. Moreover, as has been noted above, tobacco cultivation is subject to subsidies in many countries. As a result of these two policies, farmers may shift resources to tobacco cultivation. Although the extent of substitution of tobacco for food production, if any, has not been measured empirically, it must be of concern given the significant subsidies provided tobacco cultivation in many countries.

Increasing concern has been expressed for the problem of deforestation in many developing countries (Steel, 1985) and tobacco has been indicted as a factor in this growing environmental problem (World Bank, 1984). Unregulated, widespread cutting of forests for fuelwood and other purposes, can lead to soil depletion and erosion, the clogging of streams and rivers, and other environmental repercussions which may eventually result in dessertification. In addition, in many countries wood is an important source of energy for cooking and heating and the depletion of the forests may increase the cost of fuel for these basic activities.

The role of tobacco production in this environmental problem must be kept in its proper perspective. First, about

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60% of tobacco is cured by the sun or air without using an artificial energy source. Second, of the remaining 40% of tobacco, much is cured using fuels other than wood (coal in South Korea and parts of India and Zimbabwe and oil in Indonesia, Central America, and the Carribean). Countries where fuelwood is an important input to tobacco production include Bangladesh, Pakistan, Brazil, Malaysia, Malawi, Tanzania, Kenya and Serria Leone (Economist Intelligence Unit, 1983). Even in these countries the amount of wood used to process tobacco is highly variable depending on the type of wood used and the efficiency of the curing process.

The evidence suggests that deforestation may occur because of a failure to properly price fuelwood. If fuelwood is priced too low, it will be wasted not only in the production of tobacco but in other uses as well. Fuelwood will be priced too low if as in many areas, its price reflects only the the cost of gathering the wood and not the cost of maintaining the forests. Forests need to be maintained to assure future supplies of wood and to prevent the environmental impact of deforestation. Deforestation has a large external component as its environmental effects will be felt not only by tobacco producers and other users of wood but also by all those who live in the general area. In addition, there is a time or intergenerational component to resource depletion that has to be considered even in the absence of the environmental effects of defrostation.

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Because the cutting of timber without replacement in the present reduces the resources that will be available in the future, it may lead to increases in the cost of production over time and a reduction in future income. Failure to adequately plan for resource needs over time may mean that total income aggregated over a long time frame may be suboptimal. In the case of the wasteful use of wood for tobacco curing, it means that current profits from tobacco cultivation are obtained in part at the expense of future profits and that current profits may overstate the true returns from tobacco cultivation.

If fuelwood is wasted in the production of tobacco because its price is too low, a logical policy would be to seek to raise the price of fuelwood to the farmer. Such an increase in price may cause some marginal producers to cease production of tobacco while others may turn to alternative fuel sources or more fuel efficient curing barns. All of these changes would occur eventually as depletion of the forests caused the price of fuelwood to increase. It may be difficult to effectively increase the price of fuelwood so as to encourage conservation measures, but it may be possible to tie conservation measures to tobacco production in those countries where tobacco production is controlled by a central authority. This appears to be the policy in Brazil where tobacco farmers are required to plant 500 Eucalyptus trees annually in order to supply their own fuel needs for

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300

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curing (Economist Intelligence Unit, 1983). As the planting and maintaining of fuelwood plots is expensive, such a policy should also encourage the development and adoption of more fuel efficient curing barns. It may also encourage some farmers to shift to alternative fuels and others to alternative crops.

A similar policy has been announced in Kenya where farmers supplying B.A.T. must plant 1,000 Eucalyptus seedlings annually (Economist Intelligence Unit, 1983). Eucalyptus trees are planted because they grow very quickly and can produce fuelwood in 5-6 years. They require large amounts of water, however, and are difficult to grow in areas where water is scarce. Moreover, there are reports that suggest that in many instances reforestation programs announced by tobacco producers are not actually being implemented (World Bank, 1984). These factors suggest that more attention needs to be paid to developing species of trees appropriate to reforestation in different environments and that plans for reforestation may need considerable lead time and increased enforcement to be successful.

The presence and relative importance of the subsidies and externalities associated with tobacco production are complex and variable. They are ultimately factors that need to be considered in the evaluation of individual tobacco production projects especially where project planning is

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performed from a societal as opposed to an individual perspective. In many situations, those perspectives may differ and as has been discussed for tobacco, there is reason to believe that the price received by tobacco growers may in some sense overstate the value of the crop to society as a whole (8).

Policy Options

Chief among the various policies that would discourage the production of tobacco would be a decline in its price. Such a price decline would occur if there were a significant reduction in the demand for tobacco or if there were reductions in the subsidies and tariffs which support the production of tobacco in many countries. From a global perspective, it is important to remember that at current prices a significant excess supply of tobacco would be produced if production controls were to be relaxed. Accordingly, substantial price reductions may be necessary to actually reduce production.

From the perspective of an individual country, it may be useful to distinguish between tobacco produced for export and that produced for home consumption. Tobacco produced for export allows the country to participate in a subsidized

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market and capture some of the transfers between consumers and producers that occur in such markets. Such activities may have a beneficial impact on a country's net income provided there are not serious externalities associated with tobacco production.

The analysis associated with tobacco produced for domestic consumption is more problematic. In most cases the subsidies enjoyed by domestic producers are financed at the expense of domestic consumers so there is no gain to the country as a whole. Moreover, domestically financed subsidies are more likely to encourage "rent seeking" behavior on the part of domestic producers. Such behavior may not only lead to increased efforts to protect the domestic market from foreign competition but may result in attempts to encourage tobacco consumption and restrain policies designed to reduce demand for health reasons.

Tobacco sectors are also being developed to substitute for imported tobacco. The development of an import substitution tobacco sector in an LDC may appear attractive as in the short run it will save on foreign exchange, create employment and shift the subsidy paid by consumers from foreign suppliers to domestic producers. The development of a domestic tobacco sector will almost certainly result in an increase in tobacco use because of a decline in the "real" price of cigarettes. In addition, it will make it more

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difficult to mount successful anti-tobacco campaigns as the effects of such campaigns will be felt by domestic producers rather than being displaced onto foreign suppliers. Because of these potentially conflicting interests, the measurement of the net costs or benefits associated with developing a domestic import-substitution tobacco sector will need to reflect the particular idiosyncracies of each situation.

It is sometimes suggested that increased support for the production of other crops as alternatives to tobacco might be an effective way to control tobacco production (Warner, et al, 1986). This policy may have some merit but needs to be considered carefully on a case by case basis. There is reason to believe that there are viable alternatives to tobacco in some areas. For example, vegetables such as tomatoes have been suggested as alternatives to tobacco growing in North Carolina, and there is evidence that they are displacing tobacco cultivation in Tunisia to some extent (U.S. Dept of Agriculture, 1985h). In addition, some farmers in the tobacco growing area of Southern Brazil choose not to grow tobacco because of the large labor input required (Economist Intelligence Unit, 1983). This suggests that tobacco may be only marginally advantageous for quite a few growers in the area. On the other hand, soil and climatic conditions in certain locales, the tobacco growing area in Turkey for example, do not allow for the cultivation of other crops.

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Market responses to attempts to substitute other crops for tobacco may complicate this policy. Increased production of alternative crops may lead to a fall in their price not only making them less attractive substitutes for tobacco but also harming traditional producers. Similarly, declines in tobacco production by established producers may merely produce opportunities for competitors to initiate or increase production. Given the potential excess supply situation in many countries, programs which encourage the production of alternative crops by tobacco producers will probably require strict controls on tobacco production to be successful at reducing tobacco production.

The main attraction of policies designed to subsidize the production of alternative crops as substitutes for tobacco may be that they might provide a politically acceptable way to "buy-off" tobacco growers. By offering growers an acceptable, profitable alternative to tobacco growing, it may be easier to implement policies designed to reduce the demand for tobacco.

SHOULD TOBACCO PRODUCTION BE ENCOURAGED ?

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The question of whether to encourage the development of a tobacco sector can be addressed from several perspectives.

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Given current world market conditions, many tobacco development projects will be profitable for development agencies and individual tobacco growers. Tobacco projects may not only be safe investments, but more often than not, they will contribute to an increase in the national income of developing countries. Moreover, the adverse effects of tobacco consumption will not be experienced in a producing country if the tobacco is exported. Even if the tobacco is consumed domestically, the adverse health effects of its consumption may not be realized for years, and if the domestically produced tobacco were to substitute for imported tobacco, national income would frequently be enhanced without a net deterioration in health levels. Ultimately, therefore, the issue of whether to support the development of a tobacco industry has to be weighed against the political reality of the power an entrenched tobacco sector is likely to be able to wield to protect its interests.

The evidence of the behavior of the tobacco interests in much of the developed world suggests that they will leave no stone unturned in their efforts to obfuscate the relationship between tobacco use and disease and to preserve and expand their markets. The situation may become more complex when governments become dependent on taxes on tobacco products for a substantial portion of their revenue and on tobacco exports for foreign exchange earnings. Thus, the development or expansion of a tobacco sector may make it that much more

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difficult for consumers to obtain the information they need to make informed decisions about tobacco use, and their confusion may be heightened when government and quasi-government bodies encourage tobacco production.

Health considerations aside, from both a long term and a global perspective the case for promoting tobacco production on economic grounds is shaky. Although tobacco is today typically a very profitable crop, much of it advantage stems from the various subsidies, tariffs and supply restrictions that support its high price and provide economic rents for its producers. The U.S. tobacco price support program is an important determinant of the price of tobacco in international markets. By keeping the price of U.S. tobacco artificially high and the supply low, it has provided opportunities for other countries to develop tobacco sectors. The U.S. program is under attack, however, both by anti-smoking forces in the U.S. and by tobacco growers, who are finding that the market for their crop is shrinking as demand in the U.S. declines and competition from lower priced foreign producers increases. If the U.S. program were abolished or radically altered, foreign tobacco producers might have to contend with a massive increase in the supply of U.S. tobacco and a fall in tobacco prices that would make tobacco production much less profitable.

Other changes in the world tobacco market may also make

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tobacco a much less attractive crop. At present, world wide demand for tobacco is virtually stagnant except for substantial growth in China which has been able to supply its growing demand for tobacco itself. Demand for tobacco in the major developed countries has been falling because of concerns about the health effects of tobacco consumption. The evidence suggests that the decline will continue if not accelerate. Therefore, even without a major shift in U.S. tobacco policy, less developed tobacco exporting countries may find it increasingly difficult to market their crop to developed countries. This may put pressure on prices and cause less developed countries to look for outlets for their tobacco crops domestically or in other LDC's. The economic implications of such a shift could be significant. Tobacco support programs operate to benefit producers at the expense of consumers. When the producers are concentrated in the less developed countries (as they are now except for the U.S.) and their customers are concentrated in the developed world (primarily Europe and Japan), the income transfer from the developed world benefits its LDC recipients. If LDC's begin trading tobacco among themselves, the resulting inter-LDC transfer would still benefit the recipient countries but at the expense of other LDC's. From the perspective of the less developed countries as a group there would be no net gain. This inter-country transfer would be similar to the intra-country transfers that result when high tariffs and import restrictions benefit domestic producers at the expense

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of domestic consumers.

Added uncertainty in international tobacco markets is provided by the emergence of China as the world's largest producer of tobacco. Chinese tobacco production has grown extremely rapidly in recent years in order to satisfy growing domestic consumption. If the Chinese turn their attention to the international market because of slackening domestic demand, domestic health concerns or a desire to earn foreign exchange, they could have a significant impact on supply, exerting downward pressure on tobacco prices and reducing returns for other producers.

Speculation about future U.S. and China tobacco policy aside, there appears to be at present a significant potential excess supply of tobacco internationally. Evidence for this observation is found in the many policies instituted to constrain the supply of tobacco and support current prices. Demand for this tobacco is only likely to come from increased demand for tobacco products in LDC's. Such increased demand will depend on growth in income in many LDC's and on government policies conducive to tobacco consumption.

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RECOMMENDATIONS

In this paper, I have reviewed in some detail factors affecting the demand for and supply of tobacco products in

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developing countries and the potential impact of a variety of policies on both sides of the market for tobacco products. The framework of neoclassical welfare economics was used to evaluate the possible effects of various policies although it must be stressed that specific policies have to be evaluated for individual countries on a case by case basis. At this point, it may be useful to review the issues considered and weigh the pros and cons of the various policy options discussed.

For each policy considered, it is appropriate to evaluate both its benefits and costs by asking what are all the consequences of such policies likely to be? As concern about tobacco stems from it deleterious effects on health, it would be most appropriate to ask about the tangible health benefits that would result from the various policies. Realistically, however, it must be noted that the actual identifiable health benefits that might accrue from reductions in smoking in LDC's are difficult to estimate and delayed in occurrence. It may be more appropriate to evaluate policies in terms of their effects on smoking or tobacco use per se and not their ultimate health consequences. Similarly, it is difficult to measure the direct and indirect costs of various policies and to identify by whom these costs are borne. Accordingly, analysis of various policies may best be done in a kind of partial equilibrium framework in which the consequences of the

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various policies are explored without explicitly adding up their various costs and benefits. The specific recommendation that follow are derived from the evaluation of alternative policies along many dimensions including: their likely impact on tobacco use; their use of scarce resources; their distributional impact; their usefulness to correct market failure; their respect for the prerogatives of the individual; and their protection of the interests of innocent bystanders.

1. Labelling Requirements: It is strongly recommended that all tobacco products be labelled with health warnings. The warnings should be informative, clearly visible and easily understood by all members of the population at risk. Health warnings should also be prominently displayed in all tobacco advertising. Warnings are an inexpensive way to inform consumers of the added risks they face as a result of tobacco use. Although there is little empirical evidence of the impact of warning labels on tobacco use, they can do no harm and may potentially be helpful in correcting the market failure that results when consumers are uninformed about the consequences of tobacco use.

2. Advertising Restrictions: There is little empirical evidence to support the claim that tobacco advertising is an important factor in the aggregate demand for tobacco products in countries with established markets for tobacco.

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There is no information, however, on the impact of advertising in fledging tobacco markets. Most tobacco advertising tends to obfuscate the tobacco and health relationship and may accordingly introduce inefficiencies in the market for tobacco products. Accordingly, it appears reasonable to ban or severely restrict tobacco advertising in less developed countries. It must be recognized, however, that such a policy may have significant costs. These include a reduction in the income of institutions that carry tobacco advertising (including a reduction in the subsidy received by the media and certain sporting and cultural events), and a modification of the competitive environment in the market for tobacco products which may affect producers differently (this will be of little concern where the market is controlled by a government monopoly).

3. Health Education: Like the previous two recommendations public education regarding the dangers of tobacco use is intended to redress the inefficiencies that arise when consumers are not aware of the consequences of their actions. Unlike the other two policies, health education requires the commitment of resources by government or by private public service organizations. Accordingly, since resource limitations may be severe and competing wants substantial in many LDC's, health education programs for individual countries will have to be evaluated on a case by case basis.

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4. Tobacco Taxes: There is an important role for taxes on tobacco in LDC's, but great uncertainty about the appropriate level of taxation. Taxes rates equivalent to U.S.$ .40 per pack of 20 cigarettes or 40% of the retail price of cigarettes may be a reasonable upper bound to the level of taxes that could be justified by welfare economics. Subsidies to tobacco consumption appear unwarranted and taxes below U.S.$ .10 - .15 may be too low. High taxes on tobacco products can discourage their consumption, but high taxes have several drawbacks: they encourage illegal tax evasive activities; they are paternalistic; and they may penalize established smokers inequitably. The argument that very high tobacco taxes are necessary to redress uncompensated financial externalities may be invalid in most LDC's because of the absence of a societal infrastructure to support the sick, the low level of expenditure on medical care, and competing sources of illness which may effectively reduce the net impact of tobacco use on health and longevity.

5. Support for Tobacco Production: Tobacco is typically a very profitable crop because of many implicit and explicit subsidies both within the countries where it is produced and internationally. Accordingly, additional aid for tobacco production may be not only unjustifiable but unnecessary. In the short run, tobacco production may prove profitable and raise national incomes in may LDC's. A large, growing and profitable tobacco sector will, however, induce self-

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protective behavior by its participants which may make it very difficult for governments to mount effective programs to control tobacco use. Moreover, expansion of the tobacco sector in many LDC's coupled with a modification of tobacco policies by the U.S., China or Western Europe could lead to a decline in the profitability of tobacco production, an increase in attempts to promote tobacco consumption in LDC's and a shift in the pattern of tobacco subsidies to one less favorable to LDC's as a group. Accordingly, from a global perspective, there is little to justify external support for the development or expansion of tobacco production in LDC's. Multinational tobacco companies have been very willing to support the development of tobacco production and manufacturing in a number of developing countries. Given the potential excess supply of tobacco on world markets, these activities seem to be intended primarily to encourage the expansion of the domestic market for cigarettes in the recipient countries.

6. Alleviation of the Environmental Impact of Tobacco Production: In certain countries, tobacco production has been tied to increasing rates of deforestation and associated environmental problems. These conditions may be associated with significant externalities as their impact will be felt not only by tobacco producers but also by their neighbors and by future generations. Projects which address these environmental problems should be encouraged. Such projects may

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include reforestion or forest management projects, support for the development of more energy efficient tobacco curing techniques, and support for the growing of profitable alternative crops which will have a more beneficial impact on the environment. It should be recognized, however, that the problem of deforestation whether caused by tobacco curing or from other activities results from the under-pricing of forest products in many LDC's. In particular, if wood is valued only at the cost of gathering, it will be used inefficiently and economic activities such as the curing of tobacco which use wood intensively will be encouraged. Accordingly, it may be beneficial to require that users of wood be responsible for a certain amount of reforestation activity. This would not only help replenish the forests, but it would discourage activities which intensely use and/or waste wood. In the absence of policies designed to charge users of wood an appropriate price for wood, subsidized reforestation programs may only encourage its inefficient use.

7. **Research Priorities:** Given that very little is known about the effects of various tobacco control policies in LDC's almost any well executed study may yield valuable information. In such an environment and given scarce resources and a desire to develop policies expeditiously, establishing research priorities is important. Accordingly, some recommendations are:

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a. Cross-National Study of Tobacco Use Trends in Various Countries: There is substantial variability among LDC's in tobacco use and in tobacco policies. A well organized cooperative (or centrally coordinated) study of the relationships between tobacco use and tobacco policies might be a relatively inexpensive way to spot effective policies. To be worthwhile, however, the study would have to go beyond the anecdotal accounts of experience in certain countries which currently constitute the limited literature in this area. An attempt should be made to control for changes in several variables at once including trends in income or education which might seriously effect tobacco use, but which are frequently ignored in studies which focus on specific interventions. A comprehensive cross-national study might require data collected in individual countries, but it could be initiated with data collected by the USDA, World Bank, FAO and other international organizations.

b. Evaluation of the Cost of Tobacco Use in LDC's: Evidence of the deleterious effect of tobacco use is based largely experience in developed countries. As I have argued above, this information may be of limited value in many LDC's. Information is beginning to accumulate suggesting that tobacco use in some LDC's has lead to increases in the incidence of the tobacco related illnesses seen in developed countries. Little is known, however, about the aggregate

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impact of tobacco use in LDC's in part because attention has not focused on the effects of tobacco on illnesses with high prevalence in LDC's. For example, liver, stomach and bladder cancer are more prevalent than lung cancer certain LDC's. It is conceivable that the incremental effect of smoking on these cancers could have a greater impact on health in these countries than the increase in lung cancer what might accompany an increase in smoking (9). Accordingly, research into the impact of smoking on these and other diseases which might be potentiated by tobacco use in LDC's might prove valuable.

Alternatively, it might be valuable to attempt to measure directly the impact of tobacco use on health care utilization in LDC's. This could be accomplished by measuring differences in health care utilization according to smoking status in a sample of patients enrolled in established public or private health plans. Although such studies might seriously underestimate the aggregate impact of tobacco use in an LDC, the differential use ratios developed could be useful data in developing cost of smoking estimates for these countries. A strength of these estimates would be that they would not require the identification of specific tobacco-disease relationships that might require large data sets for confirmation. Moreover, they could directly address the issue of the health care costs of tobacco use in different LDC's with different health care systems and different patterns of

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disease. Lastly, with a little ingenuity it may be possible to use the ratios observed as a basis for estimating the level of uncompensated externalities in these countries and as a guide for rationalizing tobacco tax policy.

c. Traditional Vs. Modern Tobacco Sectors: In many LDC's, tobacco has been traditionally cultivated and consumed in forms other than cigarettes. There is reason to believe that these forms of consumption may not be discouraged (and may be encouraged) by taxes and other policies directed at cigarette consumption. Accordingly, examination of the relationship between "traditional" and "modern" forms of tobacco consumption may be of value in selected LDC's.

d. Supply-Demand Relationships: Despite evidence of an excess supply of tobacco, international tobacco companies have encouraged and subsidized the development of tobacco producing sectors in a number of LDC's. It appears that these activities may be designed to develop a constituency within within these countries for expansion of the domestic tobacco market. Although it may be difficult to establish a causal link between the expansion of supply and expanding demand, it may be worth the effort. Evidence of this relationship may be an important factor in shapimg government attitudes regarding the activities of the large multinational tobacco companies.

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e. Other Areas for Study: It is tempting to suggest other areas of research, but consideration of the results of 20 years of tobacco policy research in developed countries suggests that the payoff to such an endeavor may be low. At the very least, however, efforts should be made to collect more data on the patterns of tobacco use in LDC's and to include an objective evaluation component as an integral part of new tobacco control initiatives.

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Per Capita Consumption of Manufactured Cigarettes
in 110 Countries and Territories, 1982

Country or territory	Consumption (per capita)	Country or territory	Consumption (per capita)
Cyprus	3117	Jordan	867
Greece	2927	Algeria	861
Cuba	2857	Belize	850
Canada	2797	Chile	847
United States of America	2678	Nicaragua	846
Spain	2658	Albania	786
Japan	2636	Barbados	785
Hungary	2570	Tunisia	768
Poland	2517	Democratic People's Republic of Korea	713
Bulgaria	2472	Guyana	656
Australia	2340	Jamaica	650
Yugoslavia	2323	Dominican Republic	614
New Zealand	2305	Thailand	605
Switzerland	2171	Panama	599
Austria	2111	Indonesia	577
Belgium and Luxembourg	2055	Iraq	574
Singapore	1961	Honduras	563
Hong Kong	1957	Norway	556
Lebanon	1926	Morocco	537
Germany, Federal Republic of	1867	Congo	531
Italy	1854	Paraguay	521
United Kingdom of Great Britain and Northern Ireland	1818	El Salvador	508
Czechoslovakia	1812	Ecuador	508
German Democratic Republic	1796	Senegal	448
Ireland	1778	Viet Nam	424
Republic of Korea	1747	Côte d'Ivoire	422
Union of Soviet Socialist Republics	1715	Sierra Leone	419
Libyan Arab Jamahiriya	1688	Pakistan	396
Israel	1656	Angola	375
Netherlands	1652	Iran (Islamic Republic of)	364
Denmark	1636	Sri Lanka	341
France	1608	Guatemala	325
Romania	1593	Zimbabwe	319
Sweden	1543	Haiti	316
Taiwan (province of)	1531	Kenya	283
Portugal	1428	Zambia	223
Philippines	1371	Mozambique	221
Trinidad and Tobago	1318	Ghana	218
Turkey	1305	Peru	216
Uruguay	1241	Lao People's Democratic Republic	209
Malaysia	1222	Bolivia	206
Mauritius	1215	Malawi	197
Finland	1148	United Republic of Tanzania	181
Argentina	1136	Cameroon	175
Venezuela	1089	Bangladesh	170
Brazil	1051	Uganda	146
Syrian Arab Republic	1049	India	141
Democratic Yemen	1038	Zaire	129
South Africa	1002	Cape Verde	117
Fiji	986	Nigeria	98
Suriname	975	Nepal	83
China	900	Burma	71
Colombia	873	Ethiopia	48
Egypt	872	Sudan	37
Costa Rica	868	Equatorial Guinea	17

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Source: Collin Shaw and Mulligan (1984)

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320

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Table 2

Trends in Cigarette Consumption in Selected Countries

AREA	% Change Cigs	% Change Pop	% Change Cig/Pop	Cigs/Pop
	1975-79 to 1984			
North America				
CANADA	-.003	.011	-.014	2797
USA	-.002	.010	-.012	2678
Region Tot	**-.002**	**.010**	**-.012**	
Europe-Market Economies				
GER(FRG)	-.001	-.001	0	1867
U.K.	-.047	.001	-.048	1818
FINLAND	.028	.005	.023	1148
NORWAY	-.032	.004	-.036	556
SWEDEN	-.002	.001	-.003	1543
Balance of Region	.005	.004	.001	
Region tot	**-.006**	**.002**	**-.008**	
Europe-Non-Market Economies				
Bulgaria	-.002	.030	-.032	2472
Poland	.006	.009	-.003	2517
USSR	.010	.009	.001	1715
Balance of Region	.011	.005	.006	
Region tot	**.010**	**.007**	**.003**	
Oceania				
AUSTRALIA	.006	.014	-.008	2340
N.ZEALAND	-.004	.012	-.008	2305
Balance of Region	.013	.020	-.007	
Region Tot	**.006**	**.015**	**-.009**	

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382

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AREA	% Change Cigs	% Change Pop	% Change Cig/Pop	Cigs/Pop
	1975-79 to 1984			
Asia				
CHINA	.090	.012	.078	900
TAIWAN	.053	.017	.036	1531
JAPAN	.005	.007	-.002	2636
S. KOREA	.043	.015	.028	1747
INDIA	.031	.021	.010	146
Balance of Region	.028	.025	.003	
Region tot	**.054**	**.018**	**.036**	
Africa				
EYGPT	.084	.028	.056	872
MALAWI	.166	.031	.135	181
NIGERIA	-.020	.034	-.054	98
ZIMBABWE	-.030	.030	-.060	319
Balance of Region	.033	.030	.003	
Region tot	**.041**	**.030**	**.011**	
Americas(Balance)				
BRAZIL	.002	.023	-.021	1051
COLUMBIA	.080	.021	.059	873
MEXICO	.014	.026	-.040	
VENEZUELA	.001	.031	-.030	1089
Balance of Region	.023	.020	.003	
Region Tot	**.013**	**.022**	**-.009**	
WORLD	**.0256**	**.017**	**.008**	

Definitions and Sources:

% CHANGE CIGS=ANNUAL COMPOUND RATE OF GROWTH OF CIGARETTES (U.S. Dept. of Agriculture, 1985c)(Calculations by author)

% CHANGE POP=AVERAGE ANNUAL PERCENT CHANGE IN POPULATION (U.S. Bureau of the Census, 1985)

% CHANGE CIGS/POP=RATE OF CHANGE IN PER CAPITA CIGARETTE CONSUMPTION(Calculations by author)

CIGS/POP=PER CAPITA CIGARETTE CONSUMPTION 1982(Collinshaw and Mulligan, 1984)

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322

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Table 3

Health Warnings, Advertising Restrictions and Cigarette Consumption in Selected Countries

AREA	Pack Warning	Ad Ban	% Change Cigs/Pop	Cigs/Pop
North America				
CANADA	YES	PARTIAL	-.014	2797
USA	YES	PARTIAL	-.012	2678
Europe-Market Economies				
GER(FRG)	YES	PARTIAL	0	1867
U.K.	YES	PARTIAL	-.048	1818
FINLAND	YES	TOTAL	.023	1148
NORWAY	YES	TOTAL	-.036	556
SWEDEN	YES	PARTIAL	-.003	1543
Europe-Non-Market Economies				
Bulgaria	NO	TOTAL	-.032	2472
Poland	NO	TOTAL	-.003	2517
USSR	YES	TOTAL	.001	1715
Oceania				
AUSTRALIA	YES	PARTIAL	-.008	2340
N.ZEALAND	YES	PARTIAL	-.008	2305
Asia				
CHINA	NO	TOTAL	.078	900
TAIWAN	NO	PARTIAL	.036	1531
JAPAN	YES	NONE	-.002	2636
S. KOREA	YES	NONE	.028	1747
INDIA	YES	NONE	.010	146
Africa				
EYGPT	YES	PARTIAL	.056	872
MALAWI	NO	NONE	.135	181
NIGERIA	NO	NONE	-.054	98
ZIMBABWE	NO	PARTIAL	-.060	319
Americas(Balance)				
BRAZIL	NO	PARTIAL	-.021	1051
COLUMBIA	YES	PARTIAL	.059	873
MEXICO	YES	NONE	-.040	
VENEZUELA	YES	PARTIAL	-.030	1089

Source: U.S. Dept. Of Agriculture, 1984 and Table 2.

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Table 4

Market Shares of U.S.

Cigarette Manufacturers, 1947-1982

Year	R	P	B	A	Lo	Li
1947	29.7	7.0	3.2	34.5	4.3	21.3
1952	27.3	9.6	6.0	33.0	6.3	18.0
1957	28.7	9.3	10.7	29.1	7.7	14.5
1962	35.0	9.4	9.3	25.6	11.0	9.8
1967	32.5	12.7	14.3	22.2	10.2	8.1
1972	31.4	20.0	17.3	16.8	8.9	5.6
1977	33.1	26.7	15.8	12.3	8.7	3.4
1982	33.6	32.9	13.4	8.8	8.6	2.9

* R = Reynolds, P = Philip Morris, B = Brown and Williamson, A = American Brands, Lo = Lorrilard, Li = Liggett. Numbers may not sum to 100.0, due to rounding. Source: Porter (1986).

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324

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Table 5

Government Tobacco Monopoly, Tax as Percent of Price and Smoking Restrictions in Selected Countries

Area	Government Tobacco Monopoly	Tax as % Price	Smoking Restrictions	% Change Cigs/Pop	Cigs/Pop
North America					
CANADA	NO	75%	YES	-.014	2797
USA	NO	35%*	NO	-.012	2678
Europe-Market Economies					
GER(FRG)	NO	45%	YES	0	1867
U.K.	NO	75%	YES	-.048	1818
FINLAND	NO	68%	YES	.023	1148
NORWAY	NO	63%	YES	-.036	556
SWEDEN	NO	72%	NO	-.003	1543
Europe-Non-Market Economies					
Bulgaria	YES		NO	-.032	2472
Poland	YES		YES	-.003	2517
USSR	YES		NO	.001	1715
Oceania					
AUSTRALIA	NO		YES	-.008	2340
N.ZEALAND	NO		YES	-.008	2305
Asia					
CHINA	YES		NO	.078	900
TAIWAN	YES		NO	.036	1531
JAPAN	YES		YES	-.002	2636
S. KOREA	YES		NO	.028	1747
INDIA	NO		YES	.010	146
Africa					
EYGPT	YES		NO	.056	872
MALAWI	NO	25%	NO	.135	181
NIGERIA	NO		NO	-.054	98
ZIMBABWE	NO	55%	NO	-.060	319
Americas(Balance)					
BRAZIL	NO	76%	NO	-.021	1051
COLUMBIA			YES	.059	873
MEXICO	NO	57%	NO	-.040	
VENEZUELA	NO	45%	YES	-.030	1089

(Sources: U.S. Dept. of Agri.,1984. *Includes state taxes.)

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325

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TABLE 6

EXTERNAL COSTS OF SMOKING IN CANADA, SWITZERLAND AND THE U.S.

Country	Estimated Costs per Pack of Cigarettes 1983 U.S. Dollars		Per Capita Expenditure On Medical Care 1982 U.S. Dollars
	Low Estimate	High Estimate	
1) Ontario, Canada			
Health Care Costs (1976 estimates inflated to 1983 U.S. dollars)	$ .06	$ .26	1058
2) Switzerland			
Health Care Costs (1976 estimates inflated to 1983 U.S. dollars)	.05	.09	990
All External Costs (health insurance, social security and disability ins., pensions, sickness benefits)	.12	.23	
3) United States			
Health Care Costs (average of three estimates inflated to 1983 dollars)		.36	1388

Sources and Methods

Canada: Aggregate health care costs for Ontario as estimated in Stoddert, et al (1986). Inflated to 1983 Canadian dollars by rate of growth in Canadian health care expenditures 1976-83 and converted to U.S. dollars by GDP purchase parity ratios, both ratios reported in OECD, (1985). Aggregate costs divided by estimated consumption get appropriate references.

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Switzerland: Health care and all external cost data estimated by Leu and Schaub (1984). Inflated to 1983 Swiss Francs by rate of growth in Swiss health care expenditures and GNP deflator respectively for the period 1976-1983. Converted to U.S. dollars by GDP purchase parity ratios. Ratios from OECD (1985). Aggregate costs divided by estimated consumption (USDA, 1985c).

U.S.: Data on direct health care costs of smoking is the mean of three figures reported in Rice, et. al (1986). Total direct costs are multiplied by the share of U.S. health care costs financed via third parties (75%) and the percent of the population that are non-smokers (70%). Resulting number is divided by aggregate cigarette sales (U.S.D.A., 1985c).

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Table 7

Cost of Tobacco as a Factor in the Retail Price of Cigarettes

Factors	COUNTRIES			
	United States (1972)	Denmark (1984)	Brazil (1984)	Italy (1984)
	Percent of Retail Price			
Returns to Growers	6			
Manufacturing	14			
Capital Expenses	16			
Distribution	23			
Taxes	41	89	76	72
Wholesale Price		8	15	20
Retail Margins		4	9	8

Sources: U.S. Department of Agriculture(1984).
Miller(1984).

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328

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NOTES

1. Extending the disease analogy, it is interesting to compare the effects of "vaccination" and "quarantine". Vaccination prevents new cases of an infectious disease without benefitting or injuring those already afflicted. Quarantine also prevents the spread of a disease but at substantial cost to those already afflicted.

2. A "public good" is a good which will not be provided by the market in sufficient quantities for two reasons. It is characterized by non-rival consumption (many people may consume it without impairing each other's welfare) and nonexclusion (it is difficult to exclude non-buyers from the benefits of the good). Clearly, information about the health consequences of tobacco fit both these criteria.

3. In China, all tobacco products were produced and sold by the government until recently without advertising. The government has recently signed an agreement to allow R. J. Reynolds Tobacco Company to manufacture and market the company's cigarette brands in China. Preliminary reports indicate that Reynolds intends to advertise its cigarettes in China.

4. It might be easier to apply restrictions on the supply of tobacco in countries where tobacco use is rare, as has been suggested by Chandler (1986). However, the experience of the U.S. and other developed countries with the introduction and rapid dissemination of controlled psychogenic substances from abroad suggests that a favorable assessment of restrictive policies should await assessment of the actual results they produce.

5. Although tobacco is typically a minor factor in the retail price of cigarettes, lack of foreign exchange to purchase tobacco abroad may be factor in limiting the availability of cigarettes in non-tobacco producing countries. For example, the Egyptian cigarette industry is dependent on U.S. subsidies to finance its tobacco purchases. Foreign exchange shortages may be so extreme that countries may ban cigarette imports or restrict the importation of paper and packaging material used to manufacture cigarettes. These restrictions seem to arise when nominal exchange rates overvalue local currencies. Under these circumstances, it may appear profitable to produce tobacco domestically and governments may encourage such production to alleviate demand pressures.

6. Although the tobacco quality may be a factor best appreciated by experts, even casual reading of the literature suggests that it is of prime concern to most purchasing agents.

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7. Currently, international trade in tobacco is dominated by several countries. The principal markets for tobacco exports are Western Europe and Japan, high income countries with large populations of smokers and relatively low levels of tobacco production. The major tobacco exporters are the U.S., Turkey, Greece, India and Brazil. Turkey and Greece produce "Oriental" tobacco which is used for flavoring purposes in blending modern cigarettes. Brazil and to a lesser extent India, however, are examples of countries whose tobacco industry has benefitted from the U.S. tobacco subsidy program and would be injured by a change in U.S. policy.

8. This observation needs to be qualified by the realization that the high taxes levied on tobacco products in many countries drives a wedge between the price producers receive for tobacco and the value placed on the crop by consumers. In the absence of the deleterious health effects associated with tobacco, there would be reason to believe that welfare could be increased by removing subsidies and taxes and increasing production. Given the dire health effects of such a laissez faire policy, however, the evaluation of the gains and losses resulting from the current strongly controlled market is problematic.

9. This speculation is based in part on the observation that although in some developed countries, smoking accounts for as much as 90% of lung cancer and only 25% of cardiovascular disease, the increment in cardiovascular disease accounts for more premature mortality, morbidity, and economic costs than does the increment in lung cancer (Rice, et al, 1986).

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APPENDIX TABLE

Trends in Cigarette Consumption World-Wide

AREA	% Change Cigs	% Change Pop	% Change Cig/Pop	Cigs/Pop
North America				
BARBADOS	.016	.003	.013	785
BELIZE	.024	.018	.006	
CANADA	.003	.011	-.014	2797
COSTA RICA	-.011	.027	-.038	868
CUBA	.027	.010	.017	2857
DOM.REP.	.021	.027	-.006	614
EL SALVADOR	.002	.011	.009	508
GUATEMALA	-.006	.032	-.038	325
GAUDOLOPE			.016	
HAITI	.007	.016	-.009	316
HONDURAS	.015	.031	-.016	563
JAMAICA	-.029	.017	-.046	650
MARTINIQUE				
MEXICO	-.014	.026	-.040	
NICARAGUA	.041	.032	.009	846
PANAMA	.011	.020	-.0[illegible]	599
TRIN-TOBAGO	.034	.015	.0[illegible]	1318
USA	-.002	.010	-.012	2678
REGION TOT	.0005	.014	-.014	
South America				
ARGENTINA	.009	.016	-.007	1136
BOLIVIA	-.027	.026	-.053	206
BRAZIL	.002	.023	-.021	1051
CHILE	-.024	.015	-.039	847
COLUMBIA	.080	.021	.059	673
ECUADOR	.026	.027	-.001	508
GUYANA	.005	.005	0.0	656
PARAGUAY	-.015	.028	-.043	521
PERU	.015	.025	-.010	216
SURINAM	.010	.012	-.002	975
URUGUAY	.011	.003	.008	1241
VENEZUELA	.001	.031	-.030	1089
REGION TOT	.012	.022	-.010	

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3360

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AREA	%Change Cigs	% Change Pop	% Change Cig/Pop	Cigs/Pop
Africa				
ALGERIA	.068	.031	.037	861
ANGOLA	.002	.024	-.022	375
BENIN	.013	.029	-.016	
B.FASO	.079	.020	.059	
CAMEROON	.110	.025	.085	175
CAPE VERDE	.034	.010	.024	117
CHAD	.025	.03	-.012	
CONGO	.019	.028	-.009	521
EYGPT	.084	.028	.056	872
ETHIOPIA	.012	.018	-.006	49
GHANA	-.018	.032	-.050	218
GUINEA	.026	.027	-.001	17
IVORY COAST	.026	.040	-.014	422
KENYA	.053	.041	.012	283
LIBERIA	-.001	.032	-.033	
LYBIA	.017	.054	-.037	1688
MADAGASCAR	.050	.028	.022	
MALAWI	.166	.031	.135	181
MAURITUS	.025	.013	.012	
MOROCCO	.023	.029	-.006	537
MOZAMBIQUE	.017	.025	-.008	221
NIGER	.005	.032	-.027	
NIGERIA	-.020	.034	-.054	98
REUNION	.023			
SENEGAL	.011	.032	-.021	448
SIERRA LEONE	.002	.025	-.023	396
SOUTH AFRICA	.021	.025	-.004	1002
SUDAN	.000	.030	-.030	37
TANZANIA	-.011	.031	-.042	209
TOGO	.023	.030	-.007	
TUNISIA	.038	.025	.013	768
UGANDA	.012	.027	-.015	146
ZAIRE	-.001	.028	-.029	129
ZAMBIA	.034	.033	.001	223
ZIMBABWE	-.030	.030	-.060	319
REGION TOT	.041	.030	.011	

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337

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AREA	% Change Cigs	% Change Pop	% Change Cig/Pop	Cigs/Pop
Asia				
AFGHANISTAN	.073	-.013	.086	
BANGLADESH	.028	.028	0	170
BRUNEI	.079	.036	.046	
BURMA	.030	.020	.010	71
TAIWAN	.053	.017	.036	1531
CHINA	.090	.012	.078	900
CYPRUS	.057	.080	-.023	3117
HONG KONG	-.071	na	NA	1957
INDIA	.031	.021	.010	146
INDONESIA	.055	.022	.033	577
IRAN	-.037	.031	-.068	364
IRAQ	.005	.033	-.028	574
ISRAEL	.022	.022	0	1656
JAPAN	.005	.007	-.002	2636
JORDAN	.065	.039	.026	867
KAMPUCHEA	.001	.018	-.017	
N. KOREA	.029	.023	.006	713
S. KOREA	.043	.015	.028	1747
KUWAIT	-.004	.062	-.066	
LAOS	.008	.019	-.011	209
LEBANON	.032	-.005	.037	1926
MALAYSIA	-.002	.023	-.025	1222
NEPAL	.017	.025	-.008	83
PAKISTAN	.043	.030	.018	396
PHILIPPINES	.019	.024	-.006	1371
SAUDI ARABIA	.049	.034	.015	
SINGAPORE	.034	.012	.012	1961
S.YEMEN	.002	.029	-.027	1038
SRI LANKA	.017	.018	-.001	325
SYRIA	.067	.036	.031	1049
THAILAND	.028	.020	.008	599
TURKEY	.010	.022	-.012	1305
VIETNAM	.018	.024	-.006	448
U.A.E	.023	.062	-.039	
REGTOT	.054	.018	.036	

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AREA	% Change Cigs	% Change Pop	% Change Cig/Pop	Cigs/Pop
EEC				
BELGIUM	-.017	.001	-.018	2055
DENMARK	-.0002	-.001	.0008	1636
FRANCE	.006	.005	.001	1608
GER(FRG)	-.001	-.001	0	1867
GREECE	.022	.009	.013	2927
IRELAND	.002	.012	-.010	1778
ITALY	.019	.002	.017	1854
NETHERLANDS	-.079	.005	-.084	1652
U.K.	-.047	.001	-.048	1818
REG TOT	-.010	.003	-.013	
Other Europe				
AUSTRIA	.005	.002	.003	2111
FINLAND	.028	.005	.023	1148
ICELAND	.023	.011	.012	
MALTA	.043	-.005	.048	
NORWAY	-.032	.004	-.036	556
PORTUGAL	.005	.004	.001	1371
SPAIN	.015	.006	.009	2658
SWEDEN	-.002	.001	-.003	1543
SWITZ	-.008	.004	-.012	2171
REG TOT	.007	.004	-.003	
Eastern Europe				
ALBANIA	.023	.021	.002	786
BULGARIA	-.002	.030	-.032	2472
CZECH	.034	.030	.004	1812
E.GER	.011	-.002	.013	1796
HUNGARY	.006	-.001	.007	2570
POLAND	.006	.009	-.003	2517
ROMANIA	.019	.005	.014	1593
YUGOSLAVIA	.023	.008	.015	2323
REG TOT	.011	.004	.007	
USSR	.010	.009	.001	1715

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AREA	% Change Cigs	% Change Pop	% Change Cig/Pop	Cigs/Pop
Oceania				
AUSTRALIA	.006	.014	-.008	2340
FIJI	.012	.020	-.008	975
N.ZEALAND	-.004	.012	-.008	2305
PAUPA-NG	.012	.019	-.007	
SOLOMON ISL	.016	.035	-.019	
REG TOT	.006	.015	-.009	
WORLD	.025	.017	.008	
AFRICA W/O EGY/S.A.	.031	.030	.001	
ASIA W/O CHINA/JAPAN	.031	.023	.008	
WORLD W/O CHINA	.010	.019	-.009	

% CHANGE CIGS=ANNUAL COMPOUND RATE OF GROWTH OF CIGARETTE CONSUMPTION, 1975/79 to 1984 (USDA,1985c)(Calculations by author)

% CHANGE POP=AVERAGE ANNUAL PERCENT CHANGE IN POPULATION 1977 to 1984(U.S. Bureau of the Census, 1985)

% CHANGE CIGS/POP=RATE OF CHANGE IN PER CAPITA CIGARETTE CONSUMPTION(Calculations by author)

CIGS/POP=PER CAPITA CIGARETTE CONSUMPTION 1982 (Collinshaw and Mulligan, 1984)

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